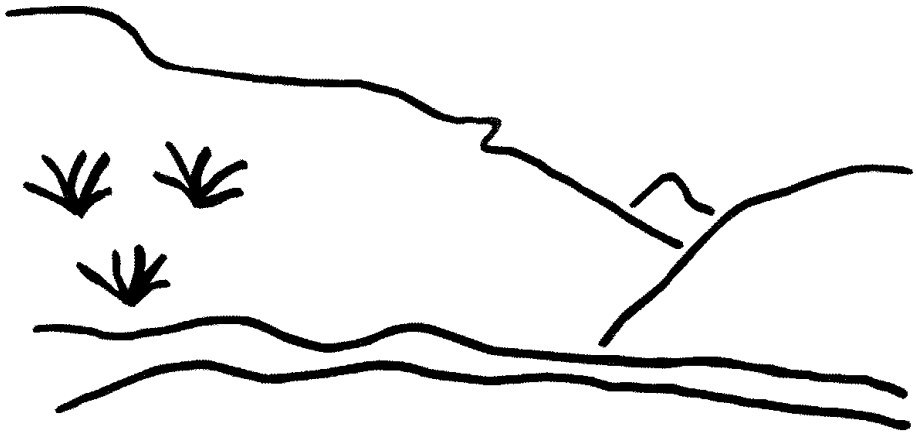
State of Utah



Utah Oil Gas and Mining

Coal Regulatory Program

Crandall Canyon
C/015/0032
Technical Analysis
~~December 15~~March 23, 2004~~ 5~~

TABLE OF CONTENTS

TECHNICAL ANALYSIS DESCRIPTION

The Division ensures that coal mining and reclamation operations in the State of Utah are consistent with the Coal Mining Reclamation Act of 1979 (Utah Code Annotated 40-10) and the Surface Mining Control and Reclamation Act of 1977 (Public Law 95-87). The Utah R645 Coal Mining Rules are the procedures to implement the Act. The Division reviews each permit or application for permit change, renewal, transfer, assignment, or sale of permit right for conformance to the R645-Coal Mining Rules. The Applicant/Permittee must comply with all the minimum regulatory requirements as established by the R645 Coal Mining Rules.

The regulatory requirements for obtaining a Utah Coal Mining Permit are included in the section headings of the Technical Analysis (TA) for reference. A complete and current copy of the coal rules can be found at http://ogm.utah.gov

The Division writes a TA as part of the review process. The TA is organized into section headings following the organization of the R645-Coal Mining Rules. The Division analyzes each section and writes findings to indicate whether or not the application is in compliance with the requirements of that section of the R645-Coal Mining Rules.

When review of an application results in findings of noncompliance with the R645-Coal Mining Rules, the Division discusses the deficiencies in the analysis sections and cites regulatory references for the deficiencies in the findings sections of the Draft TA. The regulatory references cited describe the minimum requirements for meeting the R645-Coal Mining Rules and obtaining a permit.

The Draft TA includes a summary list of deficiencies at the beginning of the document. The Applicant/Permittee will receive the summary list of deficiencies and a redline/strikeout version of the Draft TA at the completion of the review. As the Applicant/Permittee resolves the listed deficiencies, the Division modifies the Draft TA, until a Final TA with no deficiencies is written.– Approval is based upon the Final TA. The Permittee will receive an electronic version of the Final TA.

The Final TA is the starting point for review of subsequent applications for permit change, renewal, transfer, assignment, or sale of permit right. The Division modifies the analysis and findings in the Final TA to reflect the changes in the application.

SUMMARY OF DEFICIENCIES[sm:)1]

This document presents the Division's technical review of the Mining and Reclamation Plan (MRP), inlcuding all amendments currently under review for permit C/015/0032. The following summary lists all oustanding deficiencies identified by the Division.

The deficiencies pertinent to Task ID #2057 are re-iterated in the cover letter attached to this document. Only the deficiencies identified in the cover letter must be addressed prior to approval of Task ID #2057.

Responses to these deficiencies will be evaluated for compliance with the regulatory requirements. Unresolved issues may result in denial of the proposed amendment to the MRP, or may result in other actions deemed necessary by the Division to achieve compliance with the Utah Coal Regulatory Program.

Accordingly, the Division has identified the following issues:

Regulations

and LB-12; (2) A map identifying and showing the general location of vegetation in the area that could potentially be affected by mining in Little Bear Canyon; and (3) A detailed map of riparian and wetland vegetation associated with spring sites LB-7, LB-7A, LB-7B, LB-7C, LB-5A, and LB-12. 25

R645-301-723, the Permittee will need to include spring sites LB-7, LB-7A, LB-7B, and LB-7C into their quarterly monitoring plan in the event that single seam mining is to be conducted beyond spring site LB-7 in Little Bear Canyon. The springs will be monitored for flow and field parameters. 26

R645-301-724-100, -728-310, the Permittee needs to rephrase the statement in Section 7.24.1, Groundwater Information, Mine Plan Area Aquifers, "Despite the conclusions of these studies the Forest Service still believes there may be a northerly component of flow recharging Little Bear Spring". This section and the Probable Hydrologic Consequences Determination (Appendix 7-15) should more adequately address Forest Service comments and acknowledge a difference of interpretation of hydrologic studies of Little Bear Spring. Language indicating that the studies have conclusively determined that Little Bear Spring is recharged primarily from water losses in Mill Fork Canyon should be removed. 25

R645-301-725.100, the Permittee needs to further identify the IBC referenced in the last paragraph in Section 7.24.1 Groundwater Information, Methodology. 26

R645-301-725.100, the Permittee needs to include in Appendix 7-64, Baseline Information for the 120-acre IBC modification to lease U-68082, the referenced annotated photographs of selected springs, seeps, and surface monitoring sites (page 2) and surface water laboratory analytical results (page 4). 26

R645-301-727, the Permittee should change the text to reflect that an uninterrupted supply of culinary water will be assured irrespective of whether mining can be conclusively shown to have affected Little Bear Spring. Specifically, text in Section 7.24.1, Mitigation and Control Plan, stating "Should it be necessary to develop alternate water supplies due to unexpected diminution or interruption of flows as a direct result of mining activities…" should also reference the additional protection placed on Little Bear Spring. Text in Section 7.27, Alternative Water Source Information, stating "Mitigation for potential disruption to Little Bear Spring will be accomplished … if mining activity in the South Crandall lease tract affect the quality or quantity of the spring" should be changed to be consistent with the language of Special Coal Lease Stipulation #17. 40

R645-301-731-211, the Permittee needs to develop and have in place a monitoring program at least two years prior to conducting multiple seam mining beyond spring site LB-7 in Little Bear Canyon. The monitoring program should be approved by the Division in concurrence with the Forest Service prior to implementation. At a minimum, the monitoring program should consist of the following: (1) Additional monitoring of spring sites LB-7, LB-7A, LB-7B, LB-7C, LB-5A, and LB-12; (2) A map identifying and showing the general location of vegetation in the area that could potentially be affected by mining in Little Bear Canyon; and

GENERAL CONTENTS

IDENTIFICATION OF INTERESTS[sm:)2]

Regulatory Reference: 30 CFR 773.22; 30 CFR 778.13; R645-301-112

Analysis:

Identification of Interests, found in section 1.12, Chapter 1 - Volume 1of the MRP was updated with current information as part of the South Crandall Lease modification in January 2004.

Findings:

The information provided adequately addresses the minimum requirements of the General Contents – Identification of Interests section of the regulations.

PERMIT APPLICATION FORMAT AND CONTENTS

Regulatory Reference: 30 CFR 777.11; R645-301-120.

Analysis:

The permit format and contents of the Crandall Canyon No. 1 Mine Mining and Reclamation Plan (MRP) was updated in May 1993 with the LBA #9 Amendment – a significant mine plan modification. All subsequent modifications have followed the appropriate format.

Findings:

The information provided adequately addresses the minimum requirements of the General Contents –Permit Application Format and Contents section of the regulations.

VIOLATION INFORMATION[sm:)3]

Regulatory Reference: 30 CFR 773.15(b); 30 CFR 773.23; 30 CFR 778.14; R645-300-132; R645-301-113

Analysis:

Violation information has been updated with information through October 2004 with the submittal of the current application.

Findings:

The information provided adequately addresses the minimum requirements of the General Contents – Violation Information section of the regulations.

RIGHT OF ENTRY[sm:)4]

Regulatory Reference: 30 CFR 778.15; R645-301-114

Analysis:

The 120-acre Incidental Boundary Change (IBC) is an extension of federal lease UTU-68082. A copy of the lease modification has not been provided in the MRP, although a new appendix (Appendix 1-15) is referenced as its location. This will need to be included prior to permit modification approval.

Findings:

The information provided does not adequately address the minimum requirements of the General Contents – Right of Entry section of the regulations. Prior to approval, the following information must be supplied in accordance with:

R645-301-114.100, Provide proof of Right of Entry into stated federal lease UTU-68082.{ TA \l "**R645-301-114.100,** Provide proof of Right of Entry into stated federal lease UTU-68082." \s "R645-301-114.100, Provide proof of Right of Entry into stated federal lease UTU-68082." \c 6 }

LEGAL DESCRIPTION AND STATUS OF UNSUITABILITY CLAIMS[sm:)5]

Regulatory Reference: 30 CFR 778.16; 30 CFR 779.12(a); 30 CFR 779.24(a)(b)(c); R645-300-121.120; R645-301-112.800; R645-300-141; R645-301-115.

Analysis:

The IBC application is still waiting for documentation from the Bureau of Land Management (BLM) concerning the extension of federal lease UTU-68082.

Findings:

The information provided does not adequately address the minimum requirements of the General Contents – Legal Description and Status of Unsuitability Claims section of the regulations. Prior to approval, the following information must be supplied in accordance with:

R645-301-112.800, Provide documentation of the lease modification from the BLM.{ TA \l "**R645-301-112.800,** Provide documentation of the lease modification from the BLM." \s "R645-301-112.800, Provide documentation of the lease modification from the BLM." \c 6 }

PERMIT TERM[sm:)6]

Regulatory References: 30 CFR 778.17; R645-301-116.

Analysis:

The current five (5) year permit term began May 13, 2003, and expires on May 13, 2008. The permit will need to be modified by DOGM to include the IBC when the application is approved.

Findings:

The information provided adequately addresses the minimum requirements of the General Contents – Permit Term section of the regulations.

PUBLIC NOTICE AND COMMENT[sm:)7]

Regulatory References: 30 CFR 778.21; 30 CFR 773.13; R645-300-120; R645-301-117.200.

Analysis:

The addition of an Incidental Boundary Change (IBC) is not subject to public notice or comment and no public notice has been submitted.

Findings:

The information provided adequately addresses the minimum requirements of the General Contents – Public Notice and Comment section of the regulations.

PERMIT APPLICATION FORMAT AND CONTENTS

Regulatory Reference: 30 CFR 777.11; R645-301-120.

Analysis:

The Crandall Canyon No.1 Mine was significantly updated in May 1993 with the LBA #9 amendment. The MRP consists of eight (8) Volumes. The MRP has continued to be modified within the same format since 1993.

Findings:

The information provided adequately addresses the minimum requirements of the General contents – Permit Application Format and Contents section of the regulations.

ENVIRONMENTAL RESOURCE INFORMATION

Regulatory Reference: Pub. L 95-87 Sections 507(b), 508(a), and 516(b); 30 CFR 783., et. al.

PERMIT AREA[sm:)8]

Regulatory Requirements: 30 CFR 783.12; R645-301-521.

Analysis:

The information in the 120-acre IBC is adequate for the Division to identify the permit area expansion. The area for the 120-acre IBC is show in Section 5.21.13 of the MRP. The 120-acre addition consists of W1/2NW1/4 and the NW1/4SW1/4 of Section 32 T. 15S., R. 7E.

Findings:

The information provided adequately addresses the minimum requirements of the Environmental Resource Information - Permit Area section of the regulations.

HISTORIC AND ARCHEOLOGICAL RESOURCE INFORMATION[sm:)9]

Regulatory Reference: 30 CFR 783.12; R645-301-411.

Analysis:

The application includes a cultural resource survey and inventory of the proposed 120-acre IBC modification to lease U-68082. The survey was prepared by Senco-Phenix, a private consulting firm. The survey findings indicated that there were no known cultural resources located within the proposed lease addition.

Findings:

The information provided adequately addresses the minimum requirements of the Environmental Resource Information – Historic and Archeological Resource Information section of the regulations.

VEGETATION RESOURCE INFORMATION[sm:)10]

Regulatory Reference: 30 CFR 783.19; R645-301-320.

Analysis:

The vegetation resource information is provided for in chapter three of the MRP. Text changes for the 120-acre IBC modification to lease U-68082 include pages 3-iv, 3-1, 3-7, 3-8, and 3-9,. Additional appendices include 3-16 and 3-16 -A. Revised maps include plates 3-1A, B, and C and 3-2. Crandall Canyon contains ten vegetative communities. Six of these occurred in areas that have been disturbed. These communities were classified as cottonwood, sagebrush, mountain shrub/grassland, mixed mountain shrub/conifer/aspen, spruce/fir/aspen, and riparian. Also, portions of the disturbed area were previously disturbed. Appendix 3-1 contains details of the original vegetation sampling.

Genwal Resources Inc. committed to take aerial color infrared photographs every five years beginning in 1995 to monitor the effects of underground mining on vegetation. Photographs were taken in 1985, 89, 94 and 2000. The 1994 and 2000 photos were chosen for comparison. The evaluation was completed by Pat Collins from Mt. Nebo Scientific and included in the 2001 annual report. The conclusions suggest that there were no noticeable impacts on vegetation as a result of mining within the angle of draw.

The application also contains a report from Environmental Industrial Services about the vegetation in the riparian area. Included is a vegetation survey of north-facing slopes done in 1996 by Patrick Collins of Mt. Nebo Scientific. The current mining and reclamation plan contains vegetation information gathered in 1980 including the riparian area. One of the dominant grasses in the 1994 sampling of the riparian area was downy brome, but this grass was not present in any areas, including the previously disturbed area, before the mine was reopened. It is unlikely this grass would have invaded on its own without some disturbance.

There are 7 threatened or endangered and candidate plant species identified in the U. S. Fish and Wildlife Service October 2004 listing for Emery County. They include,

Barneby Reed-mustard	*Schoenocrambe barnebyi*	E
Jones Cycladenia	*Cycladenia humilis* var. *jonesii*	T
Last Chance Townsendia	*Townsendia aprica*	T
Maguire Daisy	*Erigeron maguirei*	T
San Rafael Cactus	*Pediocactus despainii*	E
Winkler Cactus	*Pediocactus winkleri*	T
Wright Fishhook Cactus	*Sclerocactus wrightiae*	E

Several more sensitive species are listed for the Manti La Sal National Forest:

- Chatterley Onion *Allium geyeri chatterleyi*
- Sweet-flowered rock jasmine *Andorsace chamaejasme carinata*
- Link Trail columbine *Aquilegia flavescens rubicunda*
- Bicknell Milkvetch *Astragalus consobrinus*
- Creutzfeldt-flower cryptanth *Cryptantha creutzfeldtii*
- Pinnate spring-parsley *Cymopterus beckii*

- Abajo daisy *Erigeron abajoensis*
- Carrington daisy *Erigeron carringtonae*
- Kachina daisy *Erigeron kachinensis*
- LaSal daisy *Erigeron mancus*
- Canyonlands lomatium *Lomatium latilobum*
- Canyon sweetvetch *Hedysarum occidentale var. canone*
- Arizona willow *Salix arizonica*
- Musinea groundsel *Senecio musiniensis*
- Maguire campion *Silene petersonii*

The application ~~should~~has been updated to include these current listings.

There are no threatened or endangered plant species known for the area according to information from Bob Thompson of the Forest Service, and no threatened or endangered plant species were encountered in the vegetation survey. However, at least two sensitive species have been found in the general vicinity. Canyon sweetvetch (*Hedysarum occidentale* var. *canone*) is present in Huntington Canyon near the turnoff to Crandall Canyon. Intermountain bitterweed (*Hymenoxys helenioides*) has been collected in Carbon and Emery Counties in mountain brush, sagebrush, aspen, and meadow communities between 8800 and 10,700 feet elevation. The permit area probably contains suitable habitat for this species, but it is unlikely to be adversely affected.

A reference area has been established in a mountain shrub/grassland community on a south-facing slope above the mine, and one in a spruce/fir/aspen community on the north-facing slope. The South Crandall lease area is primarily in riparian and spruce/fir/aspen communities.

Adequate numbers of samples were taken for the riparian and spruce/fir/aspen areas. However, the required sample size for the naturally-disturbed areas is 19.5 although only 12 samples were taken. Not meeting the minimum sample size is not a problem unless the applicant proposes to use the baseline information as a success standard for final bond release.

Since baseline information will be used as the revegetation success standard for the riparian areas, the application includes raw data for the riparian area sampling. This data is needed when comparing for final bond release to make a pooled standard deviation. Depending on the sampling distribution of the data, it might also be necessary to transform it, and the raw data would be needed for this purpose.

Woody plant density information is in reports from Mt. Nebo Scientific in Appendices 3-11 and 3-14. Measured woody plant densities were 11224 and 11989 per acre for the riparian and non-riparian areas respectively.

The MRP contains productivity information for the different plant communities and for the spruce/fir/aspen reference area. This information is commonly gathered using Natural Resources Conservation Service methods.

The location of the spruce/fir/aspen reference area is shown on Plate 2-4.

Findings:

The information provided ~~does not adequately address the minimum requirements of the Environmental Resource Information – Vegetation Resource Information~~ is adequate to meet the requirements of this section of the regulations. ~~Prior to approval the following information must be provided in accordance with:~~

~~**R645-301-321,** The applicant needs to include an updated list of the current T&E vegetation species.{ TA \l "**R645-301-321,** The applicant needs to include an updated list of the current T&E vegetation species." \s "R645-301-321, The applicant needs to include an updated list of the current T&E vegetation species." \c 6 }~~

FISH AND WILDLIFE RESOURCE INFORMATION[sm:)11]

Regulatory Reference: 30 CFR 784.21; R645-301-322.

Analysis:

Fish and wildlife information is presented in Section 3.22 and in Appendixes 3-2 and 3-3. Updates to chapter three for lease addition UTU-78953, include appendixes 3-16 and 3-17, and plates 3-1A, B, and C, 3-2 and 4-1. The MRP also contains results from several studies, including macroinvertebrate studies done in 1980 and 1994; fish and stream investigations performed in 1982, 1983, 1994, and 1995; several raptor surveys; and a survey for all birds in the area of the current portal development. A 2003 raptor survey is included in the new lease addition as appendix 3-16. It is identified in the table of contents but not in the application. A 2004 raptor survey is also included in the application and is properly identified as appendix 3-16-A.

The current disturbed areas contain some habitat for big game animals. Primary summer ranges are on the plateaus, and most winter range areas are at lower elevations than the mine. Both the South Crandall lease and 120-acre IBC modification to U-68082 applications contain mostly summer range for deer and elk with some moose winter range along the north lease boundary. Both additions to the permit area include critical value summer deer and elk and high value winter moose habitats.

Most of the permit area does not contain good cliff nesting habitat, but there are a few areas with golden eagle nests. A pair of eagles nested in a cliff above the mine in 1995. Raptor nests are shown on Plate 3-1A and on a map submitted as an addendum to Appendix 3-3. The map in the addendum contains results from the 1996 survey. The 2003 and 2004 raptor surveys are included as appendices 3-16 and 3-16-A for the new lease area. The surveys indicate that

there are no active nests within ½ mile of both the South Crandall lease area and the 120-acre IBC modification to U-68082 area.

Appendix 3-3 contains a 1980 report that discusses accipiters in Crandall Canyon. The report has evidence of past nesting and hunting activity, but no birds have been found in more recent searches. However, Crandall Canyon and similar canyons in the Huntington Creek area should be considered good accipiter habitat.

A list of twenty-two bird species identified by the Fish and Wildlife Service as migratory birds of high federal interest is in Appendix 3-3. Section 3.22.21 lists seven of these species that have the potential of migrating within the region where the mine is located.

Table 5 in Appendix 3-3 has a list of reptile and amphibian species which may be found in the area according to published information. Reptiles are found throughout the permit area, but amphibians are only associated with water. The application says baseline studies in the spring of 1994 did not encounter any threatened or endangered reptiles or amphibians. More detail of this work is in an addendum to Appendix 3-2. The MRP contains studies of macroinvertebrates and fish populations in Crandall Creek from 1994. In response to comments from the Forest Service, the permittee has committed to inventory macroinvertebrate populations in the creek every three years.

Appendix 3-2 and Section 3.22.1 discuss the importance of Crandall Creek as fish habitat. One of the recommendations in a 1982 report from Walter Donaldson, regional fish manager for the Division of Wildlife Resources, was to occasionally blow up beaver dams as they tend to accumulate silt and deter upstream trout movement. However, April 1, 1996, correspondence from the Forest Service says beaver dams are rarely barriers to fish passage. Cutthroat trout spawn during high water periods in the spring when they can swim over the dams. In March 8, 1996, correspondence to the Division, Wildlife Resources said, for its size, Crandall Creek contains a significant population of resident fish and provides a significant spawning ground/nursery.

In three years of surveys, the Division of Wildlife Resources has not found fish above a beaver pond just above the mine. However, the Forest Service in February 5, 1997, correspondence said the surveys done in 1995 were taken in late June and August and do not give any kind of picture of the function of the higher reaches of the creek for the cutthroat population. The correspondence also says the culvert would cause a significant loss of habitat and will affect the population's ability to access headwaters.

Appendix 3-10 is a memorandum from Marvin Boyer and Pete Cavalli of the Division of Wildlife Resources concerning a fish population survey done in 1996 with some data from 1994 and 1995 surveys. This document says the data strongly suggest that the middle reach of Crandall Creek, the area near the mine, is an important spawning and nursery area. It also says preliminary results of sampling for genetic study indicate the fish are a pure strain of Colorado River cutthroat trout.

Threatened or Endangered Species{tc \l3 "**Threatened or Endangered Species**}

There are 9 threatened or endangered and candidate wildlife species identified in a U. S. Fish and Wildlife Service October 2003 listing for Emery County. They include,

Bonytail[4,10]	*Gila elegans*	E
Colorado Pikeminnow[4,10]	*Ptychocheilus lucius*	E
Humpback Chub[4,10]	*Gila cypha*	E
Razorback Sucker[4,10]	*Xyrauchen texanus*	E
Bald Eagle[1]	*Haliaeetus leucocephalus*	T
Mexican Spotted Owl[1,4]	*Strix occidentalis lucida*	T
Western Yellow-billed Cuckoo	*Coccyzus americanus occidentalis*	C
Black-footed Ferret[6]	*Mustela nigripes*	E
Southwestern Willow Flycatcher	*Empidonax traillii extimus*	E

[1] Nests in this county of Utah.

[4] Critical habitat designated in this county.

[6] Historical range.

[9] Candidate species have no legal protection under the Endangered Species Act. However, these species are under active consideration by the Service for addition to the Federal List of Endangered and Threatened Species and may be proposed or listed during the development of the proposed project.

[10]Water depletions from *any* portion of the occupied drainage basin are considered to adversely affect or adversely modify the critical habitat of the endangered fish species, and must be evaluated with regard to the criteria described in the pertinent fish recovery programs.

Of the 9 species, only one, the bald eagle, could potentially occur in the permit area. However, the occurrence is most likely to be migration through the area rather than nesting or roosting.

In addition to the species discussed in the application, there is also a potential to affect the threatened and endangered fish of the upper Colorado River basin through surface water depletion.

The application ~~needs to~~ include~~s~~ an updated list of the current T&E wildlife species for the 120-acre IBC modification to lease U-68082. The application lists those species that may occur in Emery County and it contains a separate list of those species that are known or suspected of being in the Manti La Sal National Forest.

The MRP lists five sensitive species potentially present in the mine's area of influence. As discussed above, the Division of Wildlife Resources has recently (1997) preliminarily identified Colorado River cutthroat trout from Crandall Creek through genetic tests. However, the tests are not conclusive. If the fish in Crandall Creek are Colorado River cutthroats, it is very significant because this would be the only known population of Colorado River cutthroat trout in the Wasatch Plateau. It would indicate there is a barrier to fish passage that keeps Yellowstone cutthroats from coming up Crandall Creek from the Huntington River. ~~Neither the South Crandall lease or~~Neither the South Crandall lease nor the 120-acre IBC modification~~ ~~would affect the fish populations in the Crandall Canyon watershed.

Another sensitive species, the goshawk, was found near the old portals in 1980. This information is contained in a wildlife inventory report for the original application. It is almost certain other goshawks nest in the permit area. The current raptor survey confirms that there are no goshawks nesting within the proposed South lease addition.

Findings:

The information provided ~~does not adequately address the minimum requirements of the Environmental Resource Information – Fish and Wildlife Resource Information~~ is adequate to address the minimum requirements of this section of the regulations. ~~Prior to approval the following information must be provided in accordance with:~~

~~**R645-301-322,** the application needs to identify the 2003 raptor survey as appendix 3-16. Paragraph two on page 3-8 of the application refers the reviewer to letters from UDWR and USFWS Appendix 3-3. If the UDWR letter or appendix does not exist as noted in previous reviews, then this information should be revised accordingly.~~

{ TA \l "**R645-301-322,** the application needs to identify the 2003 raptor survey as appendix 3-16. Paragraph two on page 3-8 of the application refers the reviewer to letters from UDWR and USFWS Appendix 3-3. If the UDWR letter or appendix does not exist as noted in previous reviews, then this information should be revised accordingly." \s "R645-301-322, the application needs to identify the 2003 raptor survey as appendix 3-16. Paragraph two on page 3-8 of the application refers the reviewer to letters from UDWR and USFWS Appendix 3-3. If the UDWR letter or appendix does not exist as noted" \c 6 }

GEOLOGIC RESOURCE INFORMATION[sm:)12]

Regulatory Reference: 30 CFR 784.22; R645-301-623, -301-724.

Analysis:

There is geologic information in the current MRP for the permit and adjacent areas, including the South Crandall Canyon Extension (with the 40-acre SITLA-PacifiCorp sub lease) and IBC modification to lease U-68082. Geologic information was added with the submittal for

the South Crandall Canyon Extension, but other than information from adjacent mine workings, geologic data for the IBC modification to lease U-68082 area are sparse: the nearest borehole, DH-2, is located roughly one-half mile north of the IBC boundary.

Test borings and coal sampling; coal seams, overburden, and strata

Drill hole and geological information for the South Crandall Canyon Tract has been added on pages 6-5 and 6-5a. HC-4, the only borehole in the South Crandall Canyon tract, provides information on coal seam thicknesses (driller's log in Appendix 6-6).

The lowest coal seam in the Blackhawk Formation is the Hiawatha, characteristically on or just above the Star Point Sandstone. This seam has been mined in the Cottonwood/Wilberg, Deer Creek, Des-Bee-Dove, Huntington #4, and Genwal #1 Mines. The Hiawatha Seam thins to less than 5 feet in the north end of the Cottonwood/Wilberg Mine, but then thickens again to the north. The Hiawatha Seam reaches a thickness of 12 feet in the Crandall Canyon permit area, located mainly north and west of the #1 Mine portal. For the Hiawatha Seam in the South Crandall Canyon Tractand IBC modification to lease U-68082, thickness of the coal seam and cover are shown with contour lines on Plate 5-2 (H). Hiawatha to Blind Canyon interburden thicknesses are noted at the borehole locations. Hiawatha Seam thickness and cover for the Crandall Canyon #1 Mine area are on Plates 6-3 and 6-6.

The Blind Canyon Seam lies approximately 40 to 100 feet above the Hiawatha Seam. The Blind Canyon Seam has been mined in the Deer Creek, Huntington #4, and Des-Bee-Dove Mines, but is too thin to mine economically at the Cottonwood/Wilberg Mines. The Permittee states in Section 6.22.2 that the thickness of the Blind Canyon Seam is, respectively, 59 and 40 inches at in-mine drill holes DH-1 and DH-2 (although Plates 5-2 (H) and (BC) indicate a thickness of 56 inches at both drill holes) and 54 and 40 inches in surface drill-holes DH-3 and DH-4. On Plate 6-4, the Permittee has mapped a relatively small area (60 acres according to the textbut the map shows approximately 150 acres) where the Blind Canyon Seam has a thickness of 5 feet or more. The Permittee concludes that the Blind Canyon Seam does not contain sufficient coal (approximately 418,000 tons) for economic mining in the vicinity of the #1 Mine.

The Blind Canyon Seam will be mined in the South Crandall Canyon Extension, where it is thicker. For the Blind Canyon Seam in the South Crandall Canyon tract, thickness of the coal seam and cover are shown on Plate 5-2 (BC), along with the Hiawatha to Blind Canyon interburden thickness. Plate 5-2 (BC) shows that the seam is just less than 5 feet thick at HC-4 but thickens to the west. Blind Canyon Seam thickness for the Crandall Canyon #1 Mine area is on Plate 6-4.

The Bear Canyon Seam is too thin to mine economically in both the Crandall Canyon #1 Mine and the South Crandall Canyon Tract. Plate 6-5 is the Bear Canyon Seam thickness isopach map for the #1 Mine area. The Bear Canyon Seam is only 2 feet thick in borehole HC-4 (Appendix 6-6), the only borehole in the South Crandall Canyon Tract.

There is little or no thickness information for the Blind Canyon and Bear Canyon Seams for areas in or adjacent to the IBC modification to lease U-68082: the small size of the IBC area and the absence of access through adjacent workings indicate recovery of coal from these seams, even if thick coal were present, would probably not be economic. Although Plates 6-4 (Blind Canyon Seam Thickness) and 6-5 (Bear Canyon Seam Thickness) cover the area of this lease modification, these plates have not been updated to show the lease modification boundary. Plate 6-7, Hiawatha Structure, also does not show the boundary.

Test Borings and Coal Sampling information (section 6.22.1, pages 6-4 and 6-5) includes coal quality for both the Hiawatha and Blind Canyon Seams. Borehole HC-4 is the source of information for the South Crandall lease. Section 6.22.2 on page 6-5 includes information on coal reserves and on the nature, depth, and thickness of coal seams, rider seams, overburden, and interburden. Appendices 6-1, 6-5, and 6-6 contain additional geologic information. Drill-hole locations are shown on Plates 5-2 (BC) and 5-2 (H). Reference is made in several places to Plate 5-2, which can be understood to cover 5-2 (H) and 5-2 (BC).

The first paragraph on page 6-6 refers to the State leases only, so the information regarding the coal seams in the State leases is sufficient.

Acid- and toxic-forming materials

For the Crandall Canyon #1 Mine, acid- and toxic-forming characteristics for strata immediately over and under the Hiawatha and Blind Canyon Seams in the #1 Mine area are discussed on pages 6-8 and 6-9. Analysis results for the Hiawatha coal also are discussed on page 6-9. The Permittee has not provided analyses for acid- and toxic-forming characteristics for the Blind Canyon Seam, in either the #1 Mine area or the South Crandall Canyon Tract. The Permittee states on page 6-9 of the proposed amendment that there is currently no access to unweathered Blind Canyon materials (the cores taken in 1981 at HC-4 are apparently not available for analysis); however, coal and adjacent strata will be analyzed when the rock tunnels reach the Blind Canyon Seam.

Engineering properties - clays and soft rock

According to section 6.24.34 on page 6-9, strata immediately above and below the "seam to be mined" do not contain clays or soft rock. Those statements are based on information in Appendices 6-1 and 6-5 and apply to the Hiawatha Seam only.

The lithology log of HC-4 in Appendix 6-6 shows the thickness of the claystone and shale immediately above and below the Blind Canyon Seam. There is currently no access to unweathered materials for analysis. Engineering properties will be determined after rock tunnels are constructed to the Blind Canyon Seam. The Blind Canyon Seam is not thick enough to allow the leaving of thick layers of coal on the roof and floor, and soft rock in the roof and floor increases the probability that there will be waste rock that will need to be disposed of.

Geologic information pertaining to hydrology (Little Bear Spring in particular)

Because of concerns from the US Forest Service that full extraction mining would occur where overburden thickness was less than 600 feet, and that this might affect the perennial nature of the stream in Little Bear Canyon above Little Bear Spring, Genwal Resources used surveying and geopositioning to more accurately map the contact between the Price River and Blackhawk Formations and the locations of seeps and springs in the canyon, and Appendix 7-63 has been added.

Location coordinates of seep and springs and field quality and quantity data are tabulated in Appendix 7-63. The Hiawatha and Blind Canyon Seam maps show the relation of the streams, springs, and seeps to the projected workings and where there is 600 feet of cover above the seam. The Geology map shows the location of seeps and springs in relation to the contact between the Price River and Blackhawk Formations.

Little Bear Spring is located adjacent to the South Crandall Canyon Tract, and Castle Valley Special Service District (CVSSD) has great concerns about protecting this important water supply from mining related damage. Information on how geology may affect the occurrence, availability, movement, quantity and quality of potentially impacted surface and ground water in the South Crandall Canyon Tract and adjacent areas was studied extensively before the South Crandall Canyon lease was issued. Using these studies, the BLM and the Manti-La Sal National Forest concluded that mining in the South Crandall Canyon Tract has a low potential to disrupt Little Bear Spring, and they signed a FONSI in February 2003. Copies of the reports prepared from these studies are included in the proposed amendment as appendices to Chapter 7, and the appendices number and title are listed on page 6-7a.

Findings:

The information provided adequately addresses the minimum requirements of the Environment Resource Information – Geologic Resource Information section of the regulations.

HYDROLOGIC RESOURCE INFORMATION

Regulatory Reference: 30 CFR Sec. 701.5, 784.14; R645-100-200, -301-724.

Analysis:

Sampling and Analysis[sm:)13]

The ~~existing~~ MRP for the Crandall Canyon No. 1 Mine includes the monitoring of fourteen springs, five stream locations, eleven groundwater wells (only two of which have not been either sealed off or destroyed), and two UPDES sites. The ~~p~~Permittee has added ~~four~~ eight spring and six stream monitoring locations for the South Crandall Lease area to their ~~existing~~ water monitoring program. Two spring and one stream monitoring location has been added for the ~~No additional monitoring locations are to be included for~~ the 120-acre IBC modification to

U-68082 area. As stated in Section 7.2 Sampling and Analysis of the mines existing MRP, "all water samples are collected and analyzed according to methods in either the "Standard Methods for the Examination of Water and Waste Water" or the 40 CFR parts 136 and 434".

Baseline Information[sm:)14]

A description of the hydrologic and geologic characteristics of the Crandall Canyon Mine permit area, the South Crandall lease area and the additional 40-acre sublease area (part of the South Lease)~~-~~, and the 120-acre IBC modification toU-68082 areas are included in~~-~~ Section 7.24.1, Groundwater Information, and Section 7.24.2, Surface Water Information.~~-~~ Spring and seep surveys were conducted in and adjacent to the permit area in 1985, 1987, 1989, and 1993. Baseline spring and seep information is provided in Appendices 7-16 through 7-20. Baseline surface flow information provided from a USGS gaging station located at the mouth of Crandall Canyon Creek from 1978 through 1984 is presented in Appendix 7-2 and provided from Parshall flumes and instantaneous stream flow measurements from Crandall Canyon, Blind Canyon, Horse Canyon, and Indian Creek are presented in Appendix 7-23. Baseline information of the premining groundwater and surface water features within and adjacent to the South Crandall lease area and the U-68082 Lease Modification area are included in Appendix 7-58 and 7-64, respectively.

Appendix 7-58 identifies and shows the locations of seeps, springs, surface water, and drainages that have been monitored within and adjacent to the lease area since 1980. Little Bear Spring and Little Bear ~~Canyon~~ Creek have been monitored since 1957 and 1970, respectively. The tabulated baseline data presents discharge, flow, and field parameter (including temperature, pH, and conductivity) data available for each monitoring site. Major ion, trace metal, and nutrient water quality data collected by Genwal in June and August, 2003, are also presented for the four springs and six surface water monitoring sites ~~to be~~that were included in the Genwal's original ammended water monitoring program for the South Crandall lease area and the additional 40-acre sublease area (portion of the South Lease area). Because of USFS concerns of certain seeps and springs associated with riparian vegetation in Little Bear Canyon, several seeps and springs were added to the monitoring program (LB-7, LB-7A, LB-7B, LB-7C, and LB-12) and one spring was removed (LB-2). These additional seeps and springs were not part of the baseline study reported in Appendix 7-58. However, quarterly monitoring of these springs will begin in 2005 assuring that at least two years of seasonal monitoring (flow and field parameters) of these springs will be acquired prior to mining beneath Little Bear Canyon.

Supplemental hydrologic information has been added as Appendices 7-52 through 7-57, and 7-59 through 7-62 to address the complex hydrogeology of Little Bear Spring. Little Bear Spring is an important municipal water source and is located approximately 600 feet south of the South Crandall Lease Area in Little Bear Canyon. These appendices are scientific studies that describe, among other things, the groundwater systems encountered in the Crandall Canyon mine, their relation to Little Bear Spring, and the potential source of water for the spring. The Division agrees with the Permittee's assessment that the studies indicate that Little Bear Spring is recharged primarily through surface water and alluvial groundwater losses in Mill Fork

Canyon. This position is supported by the USFS/BLM Joint Decision Notice/Finding of No Significant Impact, Coal Lease Application UTU-78953.

However, the Forest Service has commented that the hydrologic studies have not conclusively determined that Little Bear Spring is recharged primarily from water losses in Mill Fork Canyon and that there is also a component of flow reaching the spring from the north and west. The Forest Service bases their comment on earlier studies of the spring (pre-1998) suggesting a north and west source area that was not eliminated as a possibility in later studies. ~~The Division and the Forest Service agree that the Permittee has inadequately addressed the Forest Service comment by stating in Section 7.24.1, Groundwater Information, Mine Plan Area Aquifers, "Despite the conclusions of these studies the Forest Service still believes there may be a northerly component of flow recharging Little Bear Spring". The Division requests the Permittee rephrase this statement to more adequately~~The MRP addresses the Forest Service comment and references pre-1998 studies that suggest a northerly component of flow feeding Little Bear Spring. Because these studies are not the property of Genwal, the Division will keep these studies available for review in the Division's Public Information Center.

~~acknowledge a difference of interpretation of the studies. Language indicating that the studies have **conclusively** determined that Little Bear Spring is recharged primarily from water losses in Mill Fork Canyon should be removed. In addition, the possibility of intercepting part of the fracture system that is believed to be the primary means of conveyance of groundwater to Little Bear Spring should be addressed in Section 7.24.1, Groundwater Information, Effects of Mining Operation on Groundwater.~~

Baseline information of the premining groundwater and surface water features within and adjacent to the proposed 120-acre IBC modification to U-68082 is included as Appendix 7-64, Baseline Information for the 120-acre IBC modification to U-68082. Appendix 7-64 identifies and shows the locations of seeps, springs, surface water, and drainages that have been monitored within and adjacent to the lease area since 1985. Baseline monitoring of the seeps and springs was collected during June and October 1985, June and September/October 1993, and May 2004. Shingle Creek was monitored during May, June, and July of 2004. The tabulated baseline data presents discharge, flow, and field parameter (including temperature, pH, and conductivity) data available for each monitoring site including the two springs (SP-18 and SP-22) and Shingle Creek added to the monitoring program.

~~Appendix 7-64 references annotated photographs of selected springs, seeps, and surface monitoring sites (page 2) and surface water laboratory analytical results (page 4) that are not included in the baseline data report.~~

~~In Section 7.24.1 Groundwater Information, Methodology, the last paragraph references a seep and spring survey conducted in the area around the IBC area. This IBC needs to be identified further to avoid confusion with the 120-acre IBC modification to lease U-68082.~~

The listing of water rights in and adjacent to the permit boundary, as obtained from the Utah Division of Water Rights, has been updated for the South Crandall lease area and the 102-acre IBC modification to lease U-68082 on the groundwater and surface water rights maps

(Plates 7-14 and 7-15, respectively), the tabulated listing of surface water rights (Table 7-6), and the supporting water rights information (Appendix 7-1).

Modeling[sm:)15]

A conceptual recharge model of Little Bear Spring is presented as Appendix 7-55, Investigation of the Potential for Little Bear Spring Recharge in Mill Fork Canyon, Emery County, Utah. The model uses information obtained from studies presented in other appendices including two isotopic studies, an in-mine slug test, a resistivity study, hydrogeologic information, and historical flow data. In addition, a dye tracing study and three electromagnetic (AquaTrack) studies of the Little Bear Spring recharge system are presented in the appendices. Combined, these studies make a compelling argument that the primary source of recharge to Little Bear Spring is through surface water and alluvial groundwater losses in Mill Fork Canyon.

Probable Hydrologic Consequences Determination[sm:)16]

The Probable Hydrologic Consequences Determination (PHC) (Appendix 7-15) has been updated to include reference to the 120-acre modification to lease U-68082 and the hydrologic, geologic, baseline, and supplemental information provided for the South Crandall lease area and the additional 40-acre sublease area of the South Crandall lease. No new information describing the probable hydrologic consequences of mining within the U-68082 Lease Modification area is presented except to mention that the drainages in the U-68082 lease modification are all ephemeral or intermittent. Updates in the PHC center around the recharge source to Little Bear Spring and the potential impacts of the proposed mine workings on the spring. Studies indicate that fractures in the Star Point Sandstone act as a conduit to provide surface and alluvial water from Mill Fork Canyon to Little Bear Spring. Because this fracture system lies outside of the South Crandall Lease permit boundary, and a regional Star Point aquifer does not likely contribute to the fracture system, then it is considered extremely unlikely that the proposed mining activities will impact the spring. In addition, the Star Point Formation will not be undermined by the proposed mining in the South Crandall Lease area or the 120-acre IBC modification to lease U-68082 because the coal seams proposed for mining are stratigraphically above the Star Point Formation.

As stated above (Hydrologic Resource Information, Baseline Information) the Forest Service has commented that the hydrologic studies have not conclusively determined that Little Bear Spring is recharged primarily from water losses in Mill Fork Canyon and that there is also a component of flow reaching the spring from the north and west. The PHC addresses the Forest Service comment and references pre-1998 studies that suggest a northerly component of flow feeding Little Bear Spring. Because these studies are not the property of Genwal, the Division will keep these studies available for review in the Division's Public Information Center.

~~The Division requests that the Permittee adequately address the Forest Service comment and acknowledge a difference of interpretation of the studies. Language indicating that the studies have **conclusively** determined that Little Bear Spring is recharged primarily from water losses in Mill Fork Canyon should be removed. In addition, the possibility of intercepting part~~

~~of the fracture system that is believed to be the primary means of conveyance of groundwater to Little Bear Spring should be addressed.~~

Groundwater Monitoring Plan[sm:)17]

The ~~existing~~ groundwater monitoring plan has been updated to include the monitoring of ~~four~~ eight springs and seeps located within and adjacent to the South Crandall lease area as shown on Plate 7-18. These sites include: Little Bear Spring, a municipal water source, that discharges water from fractures within the Star Point Sandstone and is located approximately 600 feet outside of the lease area; springs LB-7, LB-7A, and LB-7B, ~~site LB-2~~ that discharges from the base of the Castlegate Sandstone north slope of Little Bear Canyon~~at the south end of the lease area~~; springs~~site~~ LB-7c, LB-5A, and LB-12 that discharges from a sandstone channels in the Blackhawk Formation ~~overlying mining operations at the south end of the lease area~~in Little Bear Canyon; and site SP-79 that discharges from the Star Point Sandstone at the northeast portion of the lease area. All of the spring sites will be monitored for the field and laboratory water quality parameters listed in Table 7-4. Protocols for monitoring are listed in Table 7-10 of the MRP.

In order to conduct multiple seam mining beyond spring site LB-7, a monitoring plan must be submitted and approved by the Division in concurrence with the Forest Service at least two years prior to mining in that area. Multiple seam mining will therefore be contingent upon meeting this requirement.

~~In order to address Special Coal Lease Stipulation #9 and conduct mining in Little Bear Canyon beyond Spring LB-7, the Forest Service and the Division have agreed that monitoring programs should be developed by the Permittee and in place at least two years prior to mining in that area. The monitoring programs should be approved by the Division in concurrence with the Forest Service prior to implementation.~~

~~In the event of multiple seam mining beyond spring site LB-7 in Little Bear Canyon, a monitoring program should be developed that, at a minimum, consists of the following:~~

Because of USFS concerns on the effects of subsidence to Little Bear Creek and its associated ecosystem, additional surveys are to be conducted in 2005 that include: a map identifying and showing the general location of vegetation in the area that could potentially be affected by mining in Little Bear Canyon; and a detailed map of riparian and wetland vegetation associated with spring sites LB-7, LB-7A, LB-7B, LB-7C, LB-5A, and LB-12.

- ~~Additional monitoring of spring sites LB-7, LB-7A, LB-7B, LB-7C, LB-5A, and LB-12;~~
- ~~A map identifying and showing the general location of vegetation in the area that could potentially be affected by mining in Little Bear Canyon; and~~
- ~~A detailed map of riparian and wetland vegetation associated with spring sites LB-7, LB-7A, LB-7B, LB-7C, LB-5A, and LB-12.~~

~~In the event of single seam mining beyond spring site LB-7 in Little Bear Canyon, the Permittee will need to include spring sites LB-7, LB-7A, LB-7B, and LB-7C into their quarterly monitoring plan. The springs will be monitored for flow and field parameters.~~

As a stipulation of the South Crandall lease agreement (Special Coal Lease Stipulation #17), the Permittee has committed to mitigate for potential disruption to Little Bear Spring. Stipulation #17 states "In order to adequately protect flow from Little Bear Spring, the Lessee must enter into a written agreement with Castle Valley Special Services District (CVSSD) to assure an uninterrupted supply of culinary water equivalent to historical flows from the spring. The agreement must be in place prior to mining." A water treatment plant is to be constructed under the provisions of an agreement between Genwal, Pacificorp, and the Castle Valley Special Service District. The supply of culinary water will be assured irrespective of whether mining can be conclusively shown to have affected Little Bear Spring. A copy of the agreement that meets the requirements of Special Coal Lease Stipulation #17 is included as Appendix 7-51.

The groundwater monitoring plan has been updated to include the monitoring of two springs and seeps (SP-18 and SP-22) located within the U-68082 Lease Mod Area as shown on Plate 7-18. According to Map 7-12, Seep and Spring Locations, and Appendix 7-64, Baseline Information for the U-68082 Lease Mod Area, eight seeps and springs have been inventoried within the 120-acre addition as part of the 1985 inventory. Based on the low flow reported for the springs in the area, because the springs do not appear to discharge from a significant groundwater system, and the low likelihood that the groundwater discharge at the springs would be diverted to the mine workings through mine-induced fractures, the Division did not recommend additional groundwater monitoring. However, the USFS owns water rights for Shingle Creek and believes that contributing springs in the canyon should be protected. The Division, in consultation with the Forest Service, has agreed that a water monitoring plan for Shingle Canyon should be incorporated in the MRP for the Crandall Canyon Mine. The Permittee has committed, at the Division's request, to a water monitoring plan that includes quarterly monitoring for flow and field parameters of spring sites SP-18 and SP-22. Spring SP-22 issues from the Blackhawk Formation within the potential subsidence area of the 120-acre addition. Spring SP-18 issues from the Star Point Formation beneath the coal seam and outside of the potential subsidence boundary. The spring sites will be monitored for the field and laboratory water quality parameters listed in Table 7-4. Protocols for monitoring are listed in Table 7-10 of the MRP.

~~According to Map 7-12, Seep and Spring Locations, and Appendix 7-64, Baseline Information for the 120-acre modification to lease U-68082, eight seeps and springs have been inventoried within the 120-acre addition as part of the 1985 inventory. Three of these seeps and springs (SP-15, SP-22, and SP-23) are located in the Blackhawk Formation within the potential subsidence area of the 120-acre addition. The baseline data indicates that none of these three springs and seeps are considered significant. In addition, spring SP-22 is the only spring of the three with measurable flow in May 2004 and is located approximately 400 feet above the Hiawatha coal seam (greater than sixty times the estimated coal seam thickness of five feet). Springs SP-15 and SP-22 appear to be located at the east boundary of the potential subsidence area. Based on the low flow reported for the springs in the area, because the springs do not appear to discharge from a significant groundwater system, and the low likelihood that the~~

~~groundwater discharging at the springs would be diverted to the mine workings through mine-induced fractures, no additional groundwater monitoring is recommended.~~

Surface-Water Monitoring Plan[sm:)18]

The ~~existing~~ surface water monitoring plan has been updated to include the monitoring of four creeks with six monitoring sites located within and adjacent to the South Crandall lease area as shown on Plate 7-18. The creeks to be monitored include: the ~~intermittent~~ perennial Little Bear Canyon Creek (intermittent upstream of Little Bear Spring), the ephemeral drainage in SW ¼ of Section 4, T16S R7E (Section 4 Creek), the ephemeral drainage located along the west permit boundary along the border of Sections 5 and 6, T16S R7E, and the intermittent creek in Section 5, T16S R7E that drains into Crandall Creek downstream of the Genwal surface facilities (Section 5 Creek). Both Little Bear Canyon Creek and Section 4 Creek will be monitored approximately 100 feet above their confluence with Huntington Creek, the drainage along the west permit boundary will be monitored at station IBC-1 above the confluence with Crandall Creek. Section 5 Creek will be monitored above the confluence with Crandall Creek and at two stations located at the confluence of the drainages upper left and right forks. All of the creek sites will be monitored for the field and laboratory water quality parameters listed in Table 7-8. Protocols for monitoring are listed in Table 7-10 of the MRP.

The surface water monitoring plan has been updated to include the monitoring of Shingle Creek within the 120-acre IBC modification to lease U-68082 as shown on Plate 7-18. Shingle Creek is an intermittent creek that branches into a right and left fork at the east boundary of the lease mod area~~120-acre IBC modification to lease U-68082~~. ~~The right and left forks are steep with an estimated 2:1 gradient. Monitoring during spring runoff in May 2004 is reported in Appendix 7-64 and shows the right and left forks of No-Name Creek flowing at 1.69 gpm and 24.4 gpm, respectively. Flow near the confluence of No-Name Creek with Huntington Creek was measured at 17.8 gpm the same day indicating that No-Name Creek is likely a losing stream. As reported in Appendix 7-64, field observations and the meager spring discharge at the time of surface monitoring indicate that much of the measured flow in No-Name Creek is due to surface runoff from spring snowmelt.~~ Because ~~No-Name~~Shingle Creek is intermittent, and only a portion of the upper reaches of the right and left forks flows within the potential subsidence area, no additional surface water monitoring ~~is~~ was recommended by the Division. However, the Forest Service owns water rights for Shingle Creek and believes that contributing springs in the canyon should be protected. The Division, in consultation with the Forest Service, has agreed that a water monitoring plan for Shingle Canyon should be incorporated in the MRP for the Crandall Canyon Mine. The Permittee has committed, at the Division's request, to a water monitoring plan that includes quarterly monitoring for flow and field parameters of a stream site for Shingle Creek located just downstream of spring site SP-18 and the confluence of the left and right forks of Shingle Creek. The creek sites will be monitored for the field and laboratory water quality parameters listed in Table 7-8. Protocols for monitoring are listed in Table 7-10 of the MRP.

Baseline Cumulative Impact Area Information [sm:)19]

The Division ~~is~~has updated~~ing~~ the East Mountain CHIA to incorporate the expansion of the Crandall Canyon Mine into the South Crandall Canyon Lease Tract and the U-68082 Lease Modification area (March 28, 2005). Hydrogeologic information provided by the amendments was~~is~~ adequate for the Division to complete the~~is~~ update.

Findings:

Hydrologic Resource Information does ~~not adequately address~~meets the minimum requirements of the Environmental Resource Information – Hydrologic Resource Information section of the regulations. ~~Prior to approval the following information must be provided in accordance with:~~

~~**R645-301-724-100, -728-310**, the Permittee needs to rephrase the statement in Section 7.24.1, Groundwater Information, Mine Plan Area Aquifers, "Despite the conclusions of these studies the Forest Service still believes there may be a northerly component of flow recharging Little Bear Spring". This section and the Probable Hydrologic Consequences Determination (Appendix 7-15) should more adequately address Forest Service comments and acknowledge a difference of interpretation of hydrologic studies of Little Bear Spring. Language indicating that the studies have conclusively determined that Little Bear Spring is recharged primarily from water losses in Mill Fork Canyon should be removed.{ TA \l "**R645-301-724-100, -728-310**, the Permittee needs to rephrase the statement in Section 7.24.1, Groundwater Information, Mine Plan Area Aquifers, \"Despite the conclusions of these studies the Forest Service still believes there may be a northerly component of flow recharging Little Bear Spring\". This section and the Probable Hydrologic Consequences Determination (Appendix 7-15) should more adequately address Forest Service comments and acknowledge a difference of interpretation of hydrologic studies of Little Bear Spring. Language indicating that the studies have conclusively determined that Little Bear Spring is recharged primarily from water losses in Mill Fork Canyon should be removed." \s "R645-301-724-100, -728-310, the Permittee needs to rephrase the statement in Section 7.24.1, Groundwater Information, Mine Plan Area Aquifers, \"Despite the conclusions of these studies the Forest Service still believes there may be a northerly component " \c 6 }~~

~~**R645-301-724-100, -728-350**, the Permittee needs to address the possibility of intercepting part of the fracture system that is believed to be the primary means of conveyance of groundwater to Little Bear Spring in Section 7.24.1, Groundwater Information, Effects of Mining Operation on Groundwater, and in the Probable Hydrologic Consequences Determination (Appendix 7-15).~~

~~**R645-301-723**, the Permittee needs to develop and have in place a monitoring program at least two years prior to conducting multiple seam mining beyond spring site LB-7~~

~~in Little Bear Canyon. The monitoring program should be approved by the Division in concurrence with the Forest Service prior to implementation. At a minimum, the monitoring program should consist of: (1) Additional monitoring of spring sites LB-7, LB-7A, LB-7B, LB-7C, LB-5A, and LB-12; (2) A map identifying and showing the general location of vegetation in the area that could potentially be affected by mining in Little Bear Canyon; and (3) A detailed map of riparian and wetland vegetation associated with spring sites LB-7, LB-7A, LB-7B, LB-7C, LB-5A, and LB-12.{ TA \l "**R645-301-723**, the Permittee needs to develop and have in place a monitoring program at least two years prior to conducting multiple seam mining beyond spring site LB-7 in Little Bear Canyon. The monitoring program should be approved by the Division in concurrence with the Forest Service prior to implementation. At a minimum, the monitoring program should consist of: (1) Additional monitoring of spring sites LB-7, LB-7A, LB-7B, LB-7C, LB-5A, and LB-12; (2) A map identifying and showing the general location of vegetation in the area that could potentially be affected by mining in Little Bear Canyon; and (3) A detailed map of riparian and wetland vegetation associated with spring sites LB-7, LB-7A, LB-7B, LB-7C, LB-5A, and LB-12." \s "R645-301-723, the Permittee needs to develop and have in place a monitoring program at least two years prior to conducting multiple seam mining beyond spring site LB-7 in Little Bear Canyon. The monitoring program should be approved by the Division in co" \c 6 }~~

~~**R645-301-723**, the Permittee will need to include spring sites LB-7, LB-7A, LB-7B, and LB-7C into their quarterly monitoring plan in the event that single seam mining is to be conducted beyond spring site LB-7 in Little Bear Canyon. The springs will be monitored for flow and field parameters.{ TA \l "**R645-301-723**, the Permittee will need to include spring sites LB-7, LB-7A, LB-7B, and LB-7C into their quarterly monitoring plan in the event that single seam mining is to be conducted beyond spring site LB-7 in Little Bear Canyon. The springs will be monitored for flow and field parameters." \s "R645-301-723, the Permittee will need to include spring sites LB-7, LB-7A, LB-7B, and LB-7C into their quarterly monitoring plan in the event that single seam mining is to be conducted beyond spring site LB-7 in Little Bear Canyon. The springs will be mo" \c 6 }~~

~~**R645-301-725.100,** the Permittee needs to include in Appendix 7-64, Baseline Information for the 120-acre IBC modification to lease U-68082, the referenced annotated photographs of selected springs, seeps, and surface monitoring sites (page 2) and surface water laboratory analytical results (page 4).{ TA \l "**R645-301-725.100,** the Permittee needs to include in Appendix 7-64, Baseline Information for the 120-acre IBC modification to lease U-68082, the referenced annotated photographs of selected springs, seeps, and surface monitoring sites (page 2) and surface water laboratory analytical results (page 4)." \s "R645-301-725.100, the Permittee needs to include in Appendix 7-64, Baseline Information for the 120-acre IBC modification to lease U-68082, the referenced annotated~~

~~photographs of selected springs, seeps, and surface monitoring sites (page 2) and surface" \c 6 }~~

~~**R645-301-725.100,** the Permittee needs to further identify the IBC referenced in the last paragraph in Section 7.24.1 Groundwater Information, Methodology.{ TA \l "**R645-301-725.100,** the Permittee needs to further identify the IBC referenced in the last paragraph in Section 7.24.1 Groundwater Information, Methodology." \s "R645-301-725.100, the Permittee needs to further identify the IBC referenced in the last paragraph in Section 7.24.1 Groundwater Information, Methodology." \c 6 }~~

MAPS, PLANS, AND CROSS SECTIONS OF RESOURCE INFORMATION[sm:)20]

Regulatory Reference: 30 CFR 783.24, 783.25; R645-301-323, -301-411, -301-521, -301-622, -301-722, -301-731.

Analysis:

Affected Area Boundary Maps[sm:)21]

The Permittee shows the proposed affected area boundaries on Plate 5-2 (BC). The information is adequate for the Division to determine the affected area boundaries.

~~The affected area boundary maps are inadequate to meet all of the requirements of the R645 regulations. Genwal Resources did not submit maps at an adequate scale. R645-301-141 requires that maps of the affected area/permit boundaries are at a scale of 1 to 24,000 or larger.~~

~~Genwal Resources submitted maps at a scale of 1 inch equals 25,000 feet, which is a scale of 1 to 30,000.~~

Archeological Site Maps[sm:)22]

The archeological site map provided for in appendix 4-1A of the MRP does not include the South Crandall lease addition. However Appendix 4-9 of the application includes a letter and a map of the lease area from Gary Gray to Jim Dykman. This information was provided to the SHPO on September 9, 2003.

Coal Resource and Geologic Information Maps

Plate 6-1, the geology map, and Plates 5-2 (H)~~,~~ and 5-2 (BC), the mine plan maps for the Hiawatha and Blind Canyon Seams, have been updated to include the 120-acre IBC modification to lease U-68082 and the South Crandall Canyon Extension. Although older maps such as 6-3, 6-4, 6-5, 6-6, and 6-7 are still in the MRP and provide valuable information for the #1 Mine, they

have effectively been superseded by 6-1, 5-2 (H), and 5-2 (BC) in the area of the IBC and South Crandall Canyon Tract and do not need to be updated.

Plate 5-2 (H) shows Hiawatha Seam thickness and cover thickness in the IBC and South Crandall Canyon Extension. Mining projections on Plate 5-2 (H) show one east-west oriented longwall panel extending into the south end of the IBC. Projected subsidence from Hiawatha Seam mining in the IBC is shown on Plate 5-2 (H).

Plate 5-2 (BC) shows Blind Canyon Seam cover thickness, but coal thickness is not shown for this seam in this area: there is no thickness information for the Blind and Bear Canyon Seams in or near the IBC, and these seams will not be mined in the IBC area.

~~The current Blind Canyon Seam thickness isopach (Plate 6-4), Bear Canyon Seam thickness isopach (Plate 6-5), Hiawatha Seam overburden thickness isopach (Plate 6-6), and structure contour map of the top of the Hiawatha Seam (Plate 6-7) do not include the South Crandall Canyon Tract. These maps do cover the 120-acre IBC modification to lease U-68082 but have not been updated to show the lease modification boundary. The boundary for the IBC modification to lease U-68082 needs to be added to several maps, but in particular Plate 5-2 (BC).~~

~~Hiawatha and Blind Canyon Seam thickness isopachs for the South Crandall Canyon Tract are on Plates 5-2 (H) and 5-2 (BC), and information on interburden is also listed on these maps. Overburden thickness contour lines are on Plates 5-2 (H) and 5-2 (BC): taking into consideration the inherent inaccuracy in the large contour interval needed to map the overburden thickness because of the steep topography, the difference between the Hiawatha and Bear Canyon overburden thicknesses is not significant, so overburden thickness contours are the same on Plates 5-2 (BC) and 5-2 (H). Plate 5-2 (H) in effect replaces Plates 6-3 and 6-6 for the west side of the Crandall Canyon Mine permit area. Plate 5-2 (BC) replaces Plate 6-4 for the west side, although neither 6-4 nor 5-2 (BC) indicates thickness of the Blind Canyon Seam in the IBC modification.~~

~~Subsidence projections for the South Crandall Canyon Tract are on Plates 5-2 (H) and 5-2 (BC). There is no projected extent of subsidence for the 120-acre IBC modification to lease U-68082. Projected subsidence from mining in the IBC needs to be shown on Plate 6-2, Plate 5-2(H), or another appropriate map.~~

The coal outcrop and strike and dip of the coal seams are on Plates 5-2 (H) and 5-2 (BC). Appendix 6-7 contains a generalized geologic cross-section that parallels the strike of the Mill Fork graben and goes from Rilda Canyon and Mill Fork through the Huntington #4 Mine and Little Bear Spring to Huntington Canyon. Because of concerns from the US Forest Service that full extraction mining in Little Bear Canyon would occur where overburden thickness was less than 600 feet, and that this might affect the perennial nature of the stream in Little Bear Canyon above Little Bear Spring, ~~Genwall~~Genwal Resources used surveying and geopositioning to more accurately map the contact between the Price River and Blackhawk Formations and the locations of seeps and springs in the canyon. The Geology map in Appendix 7-63 shows the seeps and

springs locations, which are based on surveying and geopositioning, in relation to the contact between the Price River and Blackhawk Formations. The Hiawatha and Blind Canyon Seam maps in Appendix 7-63 show the relation of the streams, springs, and seeps to the projected workings and a contour line indicating where there is 600 feet of cover above the seam.

~~Because of concerns from the US Forest Service that full extraction mining in Little Bear Canyon would occur where overburden thickness was less than 600 feet, and that this might affect the perennial nature of the stream in Little Bear Canyon above Little Bear Spring, Genwall Resources used surveying and geopositioning to more accurately map the contact between the Price River and Blackhawk Formations and the locations of seeps and springs in the canyon. The Geology map in Appendix 7-63 shows the seeps and springs locations, which are based on surveying and geopositioning, in relation to the contact between the Price River and Blackhawk Formations. The Hiawatha and Blind Canyon Seam maps in Appendix 7-63 show the relation of the streams, springs, and seeps to the projected workings and a contour line indicating where there is 600 feet of cover above the seam.~~

Cultural Resource Maps[sm:)23]

The cultural resource map provided for in appendix 4-1A of the MRP did not include the South Crandall lease addition. However Appendix 4-9 of the application includes a letter and a map of the lease area from Gary Gray to Jim Dykman. This information was provided to the SHPO on September 9, 2003.

Existing Structures and Facilities Maps

The Permittee did not need to update the existing structures and facilities maps. Plate 1-1, Crandall Canyon Mine Lease Map, shows that the area is mountainous and that only structure that exists is a U.S.F.S. trail. Plate 4-3, Crandall Canyon Mine Oil & Gas Development, does not show any activity in the South Crandall lease area.

Existing Surface Configuration Maps[sm:)24]

The Permittee shows the existing surface configuration on several maps including Plate 1-1, Crandall Canyon Mine Lease Map.

Mine Workings Maps

Mine workings are shown on Plates 5-2 (H) and 5-2 (BC~~), along with projections of mining in the South Crandall Canyon Extension and IBC modification to lease U-68082.~~ Map 5-1, Old Works Plate, shows the locations of the old workings in and around the Crandall Canyon Mine.

Monitoring and Sampling Location Maps

Genwal Resources used surveying and geopositioning to more accurately map the contact between the Price River and Blackhawk Formations and the locations of seeps and springs related to this contact in Little Bear Canyon. Locations of seeps and springs are on the Hiawatha and Blind Canyon Seam maps in Appendix 7-63. In addition to Little Bear Spring, Genwal has added the monitoring of ~~monitors two~~ six other springs in this canyon~~;~~, LB-7, LB-7A, LB-7B, LB-7C, LB-5A, and LB-12~~LB-2 and LB-5A~~. Plates 7-12 and 7-18 have been updated with the correct identification and locations of the seeps and springs in Little Bear Canyon.

Drill-hole locations are shown on Plates 5-2 (BC) and 5-2 (H). There are no new water-monitoring points in the South Crandall lease, but the location of Little Bear Spring is on several maps.

Plate 7-12 shows the seep and spring locations for the Crandall Canyon mine and surrounding area. The baseline seep and spring locations for the South Crandall lease area ~~and the additional 40-acre sublease area associated with the South Crandall lease,~~ and the 120-acre IBC modification to lease U-68082 area are shown on this plate as well as in -Appene~~d~~dices 7-58 and 7-64, respectively. – Plate 7-18 has been updated to show ~~S~~surface and groundwater monitoring locations for the South Crandall lease area ~~and the associated additional 40-acre sublease area~~ and the 120-acre IBC modification to lease U-68082 area~~are shown on an updated map in Plate 7-18~~. ~~No additional hydrologic monitoring or sampling locations for the U-68082 Lease Modification area are needed to update Plate 7-18.~~

In order to clarify the locations of significant springs in relation to the geology and longwall mining projections in Little Bear Canyon watershed, topographic maps of the watershed have been provided (Appendix 7-63) that show the following:

- Surveyed locations and identity of all springs;
- The Hiawatha and Blind Canyon seam outcrop contours;
- The Blind Canyon seam 600-foot overburden contour;
- The Hiawatha and Blind Canyon seam mining projections; and
- Surface geology.

In order to address Special Coal Lease Stipulation #9 and conduct mining in Little Bear Canyon beyond Spring LB-7, the Forest Service and the Division have agreed that a monitoring programs should be developed by the Permittee and in place at least two years prior to mining in that area. Depending upon the monitoring program developed, additional maps or an update of existing maps will be provided by the Permittee as part of the monitoring plan. Because of USFS concerns on the effects of subsidence to Little Bear Creek and its associated ecosystem, additional surveys are to be conducted in 2005 that include: a map identifying and showing the general location of vegetation in the area that could potentially be affected by mining in Little Bear Canyon; and a detailed map of riparian and wetland vegetation associated with spring sites LB-7, LB-7A, LB-7B, LB-7C, LB-5A, and LB-12. These maps are to be included in the MRP following the 2005 field season.

Permit Area Boundary Maps[sm:)25]

The permit area boundaries are shown on several maps including Plate 5-2 (BC) and Plate 5-2 (H). ~~y maps submitted as part of the 120-acre IBC modification to lease U-68082 are inadequate to meet all of the requirements of the R645 regulations. Genwal Resources did not update all of the Plate 5-2 (BC), Crandall Canyon #1 Mine and South Crandall Mine Plan.~~

Subsurface Water Resource Maps[sm:)26]

Plate 7-14, Groundwater Rights, has been updated to include the South Crandall lease area, the associated additional 40-acre sublease area, and the U-68082 Lease Modification area.

Surface Water Resource Maps[sm:)27]

Plate 7-15, Surface Water Rights, has been updated to include the South Crandall lease area, the associated additional 40-acre sublease area, and the U-68082 Lease Modification area

Vegetation and Wildlife Maps[sm:)28]

The application includes wildlife and vegetation maps for the proposed 120-acre lease addition. They are identified as plates 3-1A, B, and C and 3-2. Plate 3-2, (Regional Vegetation), needs to be revised to accurately reflect the vegetative communities and stream courses that are present in the canyon where the proposed IBC is located. Additional vegetative communities observed in the proposed lease addition were conifer, Pinyon Juniper Mountain Brush, Sagebrush, and riparian. Both forks of the canyon exhibited intermittent flow. Plates 3-1 and 3-2 appear to show perennial flow in the canyon and proposed lease area.

Findings:

The information provided in the current MRP is not adequate to meet the requirements of this section of the regulations, prior to approval the following information must be provided in accordance with:

R645-301-323, -301-411, -301-521, -301-622, -301-722, -301-731, Plate 3-2, (Regional Vegetation), needs to be revised to accurately reflect the vegetative communities and stream courses that are present in the 120-acre IBC modification to lease U-68082.{ TA \l "**R645-301-323, -301-411, -301-521, -301-622, -301-722, -301-731,** Plate 3-2, (Regional Vegetation), needs to be revised to accurately reflect the vegetative communities and stream courses that are present in the 120-acre IBC modification to lease U-68082." \s "R645-301-323, -301-411, -301-521, -301-622, -301-722, -301-731, Plate 3-2, (Regional Vegetation), needs to be revised to accurately reflect the vegetative communities and stream courses that are present in the 120-acre IBC modification to lease U-68082." \c 6 }

The information provided does not adequately address the minimum requirements of the Environmental Resource Information – Maps, Plans, and Cross Sections of Resource Information section of the regulations. Prior to approval the following information must be provided in accordance with:

R645-301-632, Projected subsidence from mining in the 120-acre IBC modification to lease U-68082 needs to be shown on a map.{ TA \l "**R645-301-632,** Projected subsidence from mining in the 120-acre IBC modification to lease U-68082 needs to be shown on a map." \s "R645-301-632, Projected subsidence from mining in the 120-acre IBC modification to lease U-68082 needs to be shown on a map." \c 6 }

R645-301-622, Several maps, but in particular Plate 5-2 (BC), need to show the boundary for the 120-acre IBC modification to lease U-68082.{ TA \l "**R645-301-622,** Several maps, but in particular Plate 5-2 (BC), need to show the boundary for the 120-acre IBC modification to lease U-68082." \s "R645-301-622, Several maps, but in particular Plate 5-2 (BC), need to show the boundary for the 120-acre IBC modification to lease U-68082." \c 6 }

~~**R645-301-141,** The Permittee must include maps of the permit and adjacent areas at a scale of 1 to 24,000 or greater and update all maps that show the permit boundaries such as Plate 5-2 (BC).{ TA \l "**R645-301-141,** The Permittee must include maps of the permit and adjacent areas at a scale of 1 to 24,000 or greater and update all maps that show the permit boundaries such as Plate 5-2 (BC)." \s "R645-301-141, The Permittee must include maps of the permit and adjacent areas at a scale of 1 to 24,000 or greater and update all maps that show the permit boundaries such as Plate 5-2 (BC)." \c 6 }~~

OPERATION PLAN

COAL RECOVERY[sm:)29]

Regulatory Reference: 30 CFR 817.59; R645-301-522.

Analysis:

Appendix 5-24, Resource and Recovery Protection Plan Approval Letter, was not included in the amendment. The Division uses the R2P2 when evaluating the coal recovery plan. In addition to the approval letter the Permittee needs to state in the amendment what they are doing to maximize coal recovery.

The Permittee plans to mine both seams in the South Crandall Canyon Lease Extension,as shown on Plate 5-2 (H) and Plate 5-2 (BC). The Permittee has developed a mine plan that will recover as much coal as is economically possible. There is no or little thickness data for the Blind Canyon and Bear Canyon Seams in or adjacent to the IBC modification to lease U-68082, and these seams will not be mined there. The nearest borehole, DH-2, is located roughly one-half mile north of the lease modification. The Division sees the small size of the area and the absence of access through adjacent workings as indicators that recovery of coal from these seams, even if thick coal were present, would probably not be economic.

Mining projections on Plate 5-2 (H) show one east-west oriented longwall panel in the Hiawatha Seam, extending into the south end of the IBC area. The Permittee states that recovery of Hiawatha coal in the IBC is speculative.

The Division is required to analyze the mine plan to ensure maximum use and conservation of coal. On mines with federal leases, such as Crandall Canyon, the BLM also does the same analyses in their resource recovery protection plan (R2P2). The Division allows the permittee to include the R2P2 and BLM findings in the permit application of amendments so that the information and studies do not have to be duplicated. In addition, the BLM's findings are often used by the Division when they do their analysis.

The Division reviewed the mine plan and found that there was not enough data to complete the analysis. The missing items include:

- A description of the type of mining that will occur in the South Crandall tract. Specifically the Division needs to know what panels will be mined with longwall equipment and what panels will be mined with continuous miners. In those panels where continuous miners are used the Permittee must indicate if first mining only or full extraction mining will occur.
- The Permittee must state any lease stipulations that could limit the amount of recoverable coal. Such lease restrictions include, but are not limited to, areas that cannot be mined, areas where first mining only can occur, areas where only single seam mining can occur

(and if so what seam will be mined), areas that cannot be mined because of overburden limitations, and areas that cannot be subsided due to overburden limitations.

The information in the Genwal Resources submittal for the 120-acre IBC modification to lease U-68082 is adequate to meet the minimum requirements for the coal recovery regulations. Genwal Resources added the 120 acres in order to recover a small amount of coal in the 1st Right Panel. They permitted additional areas because of the possibility of additional mining to the north.

The coal to the north is low (5 feet or less). The Permittee determined that a drilling program would be inadequate to determine if the area is mineable. They will do exploration with a continuous miner. If mining is feasible Genwal Resources will develop additional panels to the north.

The coal in the 120-acre IBC modification to lease U-68082 is bounded on the north and to the east by outcrops. The only practical access to the coal is through the Genwal Mine. The coal in the 120-acre IBC modification to lease U-68082 is marginal due to the seam thinness. The addition of the 120-acre IBC modification to lease U-68082 will allow the Permittee the ability to recover coal that would otherwise be sterilized.

The Division considers the additional of the 120-acre IBC a tool for the Permittee to maximize the economic recovery of the coal resources.

The BLM place the following restrictions on the South Crandall lease area:

- Full extraction mining is not authorized in panels BC-4 and HIA-5 in areas with less than 600' of overburden until it is determined that these areas can be mined without adverse impacts to the Little Bear Canyon municipal watershed.
- Mining will not be permitted until the water treatment plant is in operation for those areas identified in lease stipulation 17. At present no mining is scheduled for those areas.

Findings:

The information provided does not adequately addresss the minimum requirements of the Operation Plan – Coal Recovery section of the regulations. It should be noted that the Bureau of Land Management will issue the approval of the R2P2 to the applicant and provide a copy to the Division. Prior to approval the following information must be provided in accordance with:

R645-301-522, -523, The Permittee needs to include a description of the type of mining that will occur in the South Crandall tract. Specifically the Division needs to know what panels will be mined with longwall equipment and what panels will be

mined with continuous miners. In those panels where continuous miners are used the Permittee must indicate if first mining only or full extraction mining will occur.{ TA \l "**R645-301-522, -523,** The Permittee needs to include a description of the type of mining that will occur in the South Crandall tract. Specifically the Division needs to know what panels will be mined with longwall equipment and what panels will be mined with continuous miners. In those panels where continuous miners are used the Permittee must indicate if first mining only or full extraction mining will occur." \s "R645-301-522, -523, The Permittee needs to include a description of the type of mining that will occur in the South Crandall tract. Specifically the Division needs to know what panels will be mined with longwall equipment and what panels will be mined wi" \c 6 }

R645-301-522, -523, The Permittee needs to include any lease stipulations that could limit the amount of recoverable coal. Such lease restrictions include, but are not limited to, areas that cannot be mined, areas where first mining only can occur, areas where only single seam mining can occur (and if so what seam will be mined), areas that cannot be mined because of overburden limitations, and areas that cannot be subsided due to overburden limitations.{ TA \l "**R645-301-522, -523,** The Permittee needs to include any lease stipulations that could limit the amount of recoverable coal. Such lease restrictions include, but are not limited to, areas that cannot be mined, areas where first mining only can occur, areas where only single seam mining can occur (and if so what seam will be mined), areas that cannot be mined because of overburden limitations, and areas that cannot be subsided due to overburden limitations." \s "R645-301-522, -523, The Permittee needs to include any lease stipulations that could limit the amount of recoverable coal. Such lease restrictions include, but are not limited to, areas that cannot be mined, areas where first mining only can occur, areas" \c 6 }

R645-301-522, The Permittee must update the MRP to include any additional information that is required of the R2P2 for the South Crandall Lease , which may include map and text changes.{ TA \l "**R645-301-522,** The Permittee must update the MRP to include any additional information that is required of the R2P2 for the South Crandall Lease , which may include map and text changes." \s "R645-301-522, The Permittee must update the MRP to include any additional information that is required of the R2P2 for the South Crandall Lease , which may include map and text changes." \c 6 }

R645-301-522, The Permittee must update the MRP to include any additional information that is required of the R2P2 for the IBC Modification to Lease U-68082, which may include map and text changes.{ TA \l "**R645-301-522,** The Permittee must update the MRP to include any additional information that is required of the R2P2 for the IBC Modification to Lease U-68082, which may include map and text changes." \s "R645-301-522, The Permittee must update the MRP to include any additional information that is required of the R2P2 for the

IBC Modification to Lease U-68082, which may include map and text changes." \c 6 }

SUBSIDENCE CONTROL PLAN

Regulatory Reference: 30 CFR 784.20, 817.121, 817.122; R645-301-521, -301-525, -301-724.

Analysis:

Renewable Resources Survey[sm:)30]

The renewable resources in the area consist of grazing, timber and water. The Permittee stated in the South Crandall amendment that some of the renewable resources in the area were surface and groundwater. The Permittee has designed the mine plan to prevent damage to those resources particularly Little Bear Spring.

Subsidence Control Plan

~~The updated subsidence plan includes the following information about the South Crandall lease:~~

- ~~In most of the South Crandall lease, the Hiawatha and Blind Canyon seams will be extracted with by longwall methods. Those areas where full extraction is not permitted by the lease agreement are: 1) Areas under Little Bear Stream with less than 600 feet of overburden, 2) areas within 1,000 feet of the southeast corner of the lease in order to protect the Mill Fork Graben and 3) areas within 1,000 feet of the southern boundary of the lease in order to protect the possible water-bearing fracture system.~~
- ~~Map 5-2 BC and Map5-2H have been updated to show the area of maximum possible subsidence.~~
- ~~The subsidence monitoring program for the South Crandall lease is similar to that of the other areas. The area will have initial survey points established. The area will be aerial surveyed and surface inspections will be done.~~
- ~~Effects of planned subsidence are anticipated to be a lowering of the surface and temporary tensional fractures at the margins of the subsidence areas.~~
- ~~Mitigation for any disruption to the Little Bear Spring will be done through construction of a water treatment plant, which will provide replacement water for the spring.~~

~~The Permittee did not include information about the main power line for the site and the potential effects of subsidence. Without that information, the Division cannot determine the effects that subsidence will have on surface facilities. The Division needs the following specific information:~~

- ~~The Permittee must show the location of the main power line on all subsidence maps including but not limited to Plate 5-2 (BC) and Plate 5-2 (H).~~

~~□The Permittee must describe the anticipated effects that subsidence will have on the main power lines. The Division acknowledges that power line belongs to the Permittee and that they would be financially responsible for any damage. The Division does have general health and safety concerns about downed or damaged power lines. In particular, the possibility of a fire hazard should be addressed.~~

~~The updated subsidence plan that was submitted as part of the 120-acre IBC modification to lease U-68082 is inadequate to meet the minimum requirements for the subsidence control plan as required by the regulations. Map 5-5 does not show the extent of the maximum subsidence limits. The maximum subsidence limits needs to be included on the subsidence map for the 120-acre IBC modification to lease U-68082.~~

The updated subsidence plan includes the following information about the South Crandall lease:

- In most of the South Crandall lease, the Hiawatha and Blind Canyon seams will be extracted by longwall methods. Those areas where full extraction is not permitted by the lease agreement are: 1) Areas under Little Bear Stream with less than 600 feet of overburden, 2) areas within 1,000 feet of the southeast corner of the lease in order to protect the Mill Fork Graben and 3) areas within 1,000 feet of the southern boundary of the lease in order to protect the possible water-bearing fracture system.
- Map 5-2 BC and Map5-2H have been updated to show the area of maximum possible subsidence.
- The subsidence monitoring program for the South Crandall Lease is similar to that of the other areas. The area will have initial survey points established. The area will be aerial surveyed and surface inspections will be done.
- Effects of planned subsidence are anticipated to be a lowering of the surface and temporary tensional fractures at the margins of the subsidence areas.
- Mitigation for any disruption to the Little Bear Spring will be done through construction of a water treatment plant, which will provide replacement water for the spring.

The Permittee gave adequate information about the main power line for the site and the potential effects of subsidence because:

- The Permittee showed the location of the main power line on Plate 5-2 (BC) and Plate 5-2 (H). Those maps have a yellow line labeled as a 12.5 kV powerline.
- The Permittee updated Map 5-5 to show the areas where subsidence has and is expected to occur.
- The Permittee discussed the anticipated effects that subsidence would have on the main power lines. On page 5-26b the Permittee states that they talked with Utah Power & Light officials. The officials were quoted as saying that the risks are minimal.
- The Permittee committed to notify the Forest Service in the event of any damage to the powerline so that proper fire prevention measures can be implemented. The line in equipped with ground fault protection that will automatically and instantly de-energize the line in the vent of any damage.

The Permittee stated that they will not do full extraction mining in areas with less than 600 feet of coal. The Permittee showed the areas with more than 600 feet of cover on Plate 5-2 (BC) and Plate 5-2 (H).

Due to lease stipulations, the Permittee made the following commitment.

> "According to this plan full extraction mining (i.e. longwall mining) is not authorized in panels BC-4 and HIA-5 in areas with less than 600' overburden unless it can be determined that these areas can be mined without adverse impacts to the Little Bear Canyon municipal watershed.

The Permittee must include a map that shows the area of projected subsidence at a scale of 1:12,000 or larger. Plate 5-5 shows the workings that will subside but does not show the area of subsidence. The Permittee needs to show the subsidence zone within the angle of draw.

The Permittee was able to meet part of the subsidence control plan requirements in connection with the 120-acre IBC because they included the following:

- All mining in the 120-acre IBC will be done in the Hiawatha Seam. The purpose of the 120-acre addition is to allow the Permittee to mine coal that would otherwise be inaccessible.
- Map 5-2 (H) shows the location of the mining that will occur in the 120-acre IBC.
- Map 5-5, Subsidence Control Point Location, shows that no new subsidence control points were added for the 120-acre IBC. The area has two existing monitoring points. Because of the small area the Division believes that additional monitoring points are not needed.

Performance Standards For Subsidence Control[sm:)31]

The Permittee is required to keep all performance standards for subsidence controls.

Notification[sm:)32]

The Permittee is required to notify the water conservancy district, and all surface owners 6 months before undermining an area. The Division will inspect the Permittee's records to determine if notification was given during quarterly complete inspections.

Findings:

~~The information provided does not adequately meet the minimum requirements of the Operation Plan - Subsidence Control Plan section of the regulations. Prior to approval the following information must be provided in accordance with:~~

~~R645-301-525.420,~~ ~~The Permittee must show the location of the main power lines on each subsidence map including but not limited to Plate 5-2 (BC) and Plate 5-2 (H).{ TA \l "**R645-301-525.420,** The Permittee must show the location of the main power lines on each subsidence map including but not limited to Plate 5-2 (BC) and Plate 5-2 (H)." \s "R645-301-525.420, The Permittee must show the location of the main power lines on each subsidence map including but not limited to Plate 5-2 (BC) and Plate 5-2 (H)." \c 6 }~~

~~R645-301-525.460,~~ ~~The Permittee must state the anticipated effects of subsidence on the main power line. The Division is concern about the health and safety issues, such as a fire hazard, that could arise from downed or damaged power lines.{ TA \l "**R645-301-525.460,** The Permittee must state the anticipated effects of subsidence on the main power line. The Division is concern about the health and safety issues, such as a fire hazard, that could arise from downed or damaged power lines." \s "R645-301-525.460, The Permittee must state the anticipated effects of subsidence on the main power line. The Division is concern about the health and safety issues, such as a fire hazard, that could arise from downed or damaged power lines." \c 6 }~~

~~R645-301-525,~~ ~~The Permittee will update the MRP to include any additional information that is required of the R2P2 for the South Crandall Lease, which may include map and text changes.{ TA \l "**R645-301-525,** The Permittee will update the MRP to include any additional information that is required of the R2P2 for the South Crandall Lease, which may include map and text changes." \s "R645-301-525, The Permittee will update the MRP to include any additional information that is required of the R2P2 for the South Crandall Lease, which may include map and text changes." \c 6 }~~

~~R645-301-525,~~ ~~The Permittee will update the MRP to include any additional information that is required of the R2P2 for the IBC Modification to Lease U-68082, which may include map and text changes.{ TA \l "**R645-301-525,** The Permittee will update the MRP to include any additional information that is required of the R2P2 for the IBC Modification to Lease U-68082, which may include map and text changes." \s "R645-301-525, The Permittee will update the MRP to include any additional information that is required of the R2P2 for the IBC Modification to Lease U-68082, which may include map and text changes." \c 6 }~~

~~R645-301-525.110,~~ ~~The Permittee must update Map 5-5 in the 120-acre IBC so that areas of maximum possible subsidence are shown. Previous versions of Map 5-5 showed that information.{ TA \l "**R645-301-525.110,** The Permittee must update Map 5-5 in the 120-acre IBC so that areas of maximum possible subsidence are shown. Previous versions of Map 5-5 showed that information." \s "R645-301-525.110, The Permittee must update Map 5-5 in the 120-acre IBC so that areas of~~

~~maximum possible subsidence are shown. Previous versions of Map 5-5 showed that information." \c 6 }~~

R645-301-525.110, The Permittee must include a map that shows the areas where subsidence is expected for the entire mine. Plate 5-5 does not show the entire subsidence zone rather only those mine workings where full extraction took place.

FISH AND WILDLIFE INFORMATION

Regulatory Reference: 30 CFR Sec. 784.21, 817.97; R645-301-322, -301-333, -301-342, -301-358.

Analysis:

Protection and Enhancement Plan[sm:)33]

The only impacts to fish and wildlife would be those to habitat loss as a result of subsidence.

Crandall Creek is considered important fish habitat, and all riparian habitat is considered critical wildlife habitat. The MRP contains correspondence from the Division of Wildlife Resources discussing a wildlife protection and mitigation plan that has been developed through several months of negotiations between the permittee, Wildlife Resources, the Forest Service, Water Rights, and the Division. This plan is intended to protect the Colorado River cutthroat trout population and to mitigate for the loss of fisheries and riparian habitat.

Major points of the plan included:

1. Certain modifications would be made to Crandall Creek above the mine.

2. All the fish in the area of the culvert would be captured and transplanted to a secure and suitable temporary location. Some of these fish will be put back into Crandall Creek above the mine.

3. Alterations would be made to another stream to isolate it from other fish populations. This stream would be treated to eliminate all fish, and Colorado River cutthroats would be transplanted to it.

4. In Scad Valley, a sheep corral would be eliminated and two or three new corrals constructed. Some roads would be reclaimed to try to improve the quality of spawning habitat in this area.

Unfortunately, it is possible that moving the sheep corral and reclaiming certain roads may not result in improved stream habitat in Scad Valley Creek and would not fulfill the

requirements of R645-301-333 and R645-301-358. The Forest Service and Wildlife Resources intend to monitor this section of stream to see if the project is successful.

Endangered and Threatened Species[sm:)34]

Of the 16 vegetative and wildlife species, one, the bald eagle, could potentially occur in the permit area. However, the occurrence is most likely to be migration through the area rather than nesting or roosting. Most threatened or endangered species that could occur in Emery County occur at lower elevations than the mine and have no habitat in the proposed permit area expansion.

There have been no confirmed sightings of Black-Footed Ferrets in Emery County in several years.

The mine has potential, through water depletions, of adversely affecting four listed threatened and endangered fish species of the upper Colorado River drainage. The Fish and Wildlife Service requires mitigation when water depletions exceed 100 acre-feet annually. Page 7-12 and appendix 3-18 of the application describe the use of water for mining operations. The information on page 7-12 indicates that approximately 150 gpm, (242 acre/ft/yr), are used in water consumption for mining activities. This was an estimate based on experience at other mines. The most recent submittal dated July 7, 2004 includes calculations in appendix 3-18 that define the actual amount of water used in the mining process and water that is discharged into Crandall Creek. The calculations in appendix 3-18 indicate that 79.4-acre feet per year of water are used in mining processes and approximately 800 acre feet per year of water are discharged into Crandall Creek annually. According to these calculations, the mine would provide a net gain of 729.6 acre-feet per year of water to Crandall Creek. According to the Mayo age dating studies, this mine water is old and would not be intercepting the water associated with the springs located above the mine workings.

Bald and Golden Eagles[sm:)35]

The bald eagle could potentially occur in the permit area. However, the occurrence is most likely to be migration through the area rather than nesting or roosting. Bald eagles are common in the area during the winter and could occasionally fly through or roost in the proposed lease addition to the permit area. The raptor survey conducted in the spring of 2003 indicated that there were no golden eagle nests in the proposed lease area. The proposed mining in both the South Crandall lease and 120-acre IBC modification to lease U68082 areas would have negligible effects on these birds.

Wetlands and Habitats of Unusually High Value for Fish and Wildlife

The springs and riparian areas within the proposed 120-acre IBC modification to lease U-68082 addition would be considered habitats of high value for fish and wildlife. However, since no surface disturbance is anticipated by this permitting action the only effects on habitat would possibly be from subsidence. Any impacts on fish and wildlife habitat due to subsidence would be negligible.

Findings:

The information provided adequately addresses the minimum requirements of the Operation Plan – Fish and Wildlife section of the regulations.

VEGETATION[sm:)36]

Regulatory Reference: R645-301-330, -301-331, -301-332.

Analysis:

Vegetation should not be affected by the addition of the 120 -acre parcel. Genwal Resources Inc. is committed to taking aerial color infrared photographs every five years beginning in 1995 to monitor the effects of underground mining on vegetation.

Findings:

The information provided adequately addresses the minimum requirements of the Operation Plan - Vegetation section of the regulations.

HYDROLOGIC INFORMATION

Regulatory Reference: 30 CFR Sec. 773.17, 774.13, 784.14, 784.16, 784.29, 817.41, 817.42, 817.43, 817.45, 817.49, 817.56, 817.57; R645-300-140, -300-141, -300-142, -300-143, -300-144, -300-145, -300-146, -300-147, -300-147, -300-148, -301-512, -301-514, -301-521, -301-531, -301-532, -301-533, -301-536, -301-542, -301-720, -301-731, -301-732, -301-733, -301-742, -301-743, -301-750, -301-761, -301-764.

Analysis:

Groundwater Monitoring[sm:)37]

The groundwater monitoring plan has been updated to include the monitoring of eight springs and seeps located within and adjacent to the South Crandall lease area as shown on Plate 7-18. These sites include: Little Bear Spring, a municipal water source, that discharges water from fractures within the Star Point Sandstone and is located approximately 600 feet outside of the lease area; springs LB-7, LB-7A, and LB-7B, that discharges from the base of the Castlegate Sandstone north slope of Little Bear Canyon; springs LB-7c, LB-5A, and LB-12 that discharges from a sandstone channels in the Blackhawk Formation in Little Bear Canyon; and site SP-79 that discharges from the Star Point Sandstone at the northeast portion of the lease area. All of the spring sites will be monitored for the field and laboratory water quality parameters listed in Table 7-4. Protocols for monitoring are listed in Table 7-10 of the MRP.

In order to conduct multiple seam mining beyond spring site LB-7, a monitoring plan must be submitted and approved by the Division in concurrence with the Forest Service at least two years prior to mining in that area. Multiple seam mining will therefore be contingent upon meeting this requirement.

Because of USFS concerns on the effects of subsidence to Little Bear Creek and its associated ecosystem, additional surveys are to be conducted in 2005 that include: a map identifying and showing the general location of vegetation in the area that could potentially be affected by mining in Little Bear Canyon; and a detailed map of riparian and wetland vegetation associated with spring sites LB-7, LB-7A, LB-7B, LB-7C, LB-5A, and LB-12.

As a stipulation of the South Crandall lease agreement (Special Coal Lease Stipulation #17), the Permittee has committed to mitigate for potential disruption to Little Bear Spring. Stipulation #17 states "In order to adequately protect flow from Little Bear Spring, the Lessee must enter into a written agreement with Castle Valley Special Services District (CVSSD) to assure an uninterrupted supply of culinary water equivalent to historical flows from the spring. The agreement must be in place prior to mining." A water treatment plant is to be constructed under the provisions of an agreement between Genwal, Pacificorp, and the Castle Valley Special Service District. A copy of the agreement that meets the requirements of Special Coal Lease Stipulation #17 is included as Appendix 7-51.

The groundwater monitoring plan has been updated to include the monitoring of two springs and seeps (SP-18 and SP-22) located within the U-68082 Lease Mod Area as shown on Plate 7-18. According to Map 7-12, Seep and Spring Locations, and Appendix 7-64, Baseline Information for the U-68082 Lease Mod Area, eight seeps and springs have been inventoried within the 120-acre addition as part of the 1985 inventory. Based on the low flow reported for the springs in the area, because the springs do not appear to discharge from a significant groundwater system, and the low likelihood that the groundwater discharge at the springs would be diverted to the mine workings through mine-induced fractures, the Division did not

recommend additional groundwater monitoring. However, the USFS owns water rights for Shingle Creek and believes that contributing springs in the canyon should be protected. The Division, in consultation with the Forest Service, has agreed that a water monitoring plan for Shingle Canyon should be incorporated in the MRP for the Crandall Canyon Mine. The Permittee has committed, at the Division's request, to a water monitoring plan that includes quarterly monitoring for flow and field parameters of spring sites SP-18 and SP-22. Spring SP-22 issues from the Blackhawk Formation within the potential subsidence area of the 120-acre addition. Spring SP-18 issues from the Star Point Formation beneath the coal seam and outside of the potential subsidence boundary. The spring sites will be monitored for the field and laboratory water quality parameters listed in Table 7-4. Protocols for monitoring are listed in Table 7-10 of the MRP.

~~The existing groundwater monitoring plan has been updated to include the monitoring of four springs located within and adjacent to the South Crandall lease area and the associated additional 40-acre sublease area as shown on Plate 7-18. These sites include: Little Bear Spring, a municipal water source, that discharges water from fractures within the Star Point Sandstone and is located approximately 600 feet outside of the lease area; site LB-2 that discharges from the Castlegate Sandstone at the south end of the lease area; site LB-5A that discharges from a sandstone channel in the Blackhawk Formation overlying mining operations at the south end of the lease area; and site SP-79 that discharges from the Star Point Sandstone at the northeast portion of the South Crandall lease area and the associated 40-acre sublease area. All of the spring sites will be monitored for the field and laboratory water quality parameters listed in Table 7-4. Protocols for monitoring are listed in Table 7-10 of the MRP.~~

~~As a stipulation of the lease agreement (Special Coal Lease Stipulation #17), the Permittee has committed to mitigate for potential disruption to Little Bear Spring. Stipulation #17 states "In order to adequately protect flow from Little Bear Spring, the Leasee must enter into a written agreement with Castle Valley Special Services District (CVSSD) to assure an uninterrupted supply of culinary water equivalent to historical flows from the spring. The agreement must be in place prior to mining." A water treatment plant is to be constructed under the provisions of an agreement between Genwal, Pacificorp, and the Castle Valley Special Service District. A copy of the agreement that meets the requirements of Special Coal Lease Stipulation #17 is included as Appendix 7-51. However, in order to clarify that the intent of Stipulation #17 is met, the text in the MRP should reflect that an uninterrupted supply of culinary water will be assured irrespective of whether mining can be conclusively shown to have affected Little Bear Spring. Specifically, text in Section 7.24.1, Mitigation and Control Plan, stating "Should it be necessary to develop alternate water supplies due to unexpected diminution or interruption of flows as a direct result of mining activities…" should also reference the additional protection placed on Little Bear Spring. Text in Section 7.27, Alternative Water Source Information, stating "Mitigation for potential disruption to Little Bear Spring will be accomplished … if mining activity in the South Crandall lease tract affect the quality or quantity of the spring" should be changed to be consistent with the language of Stipulation #17.~~

~~In order to address Special Coal Lease Stipulation #9 and conduct mining in Little Bear Canyon beyond Spring LB-7, the Forest Service and the Division have agreed that monitoring programs should be developed by the Permittee and in place at least two years prior to mining in that area. The monitoring programs should be approved by the Division in concurrence with the Forest Service prior to implementation.~~

~~In the event of multiple seam mining beyond spring site LB-7 in Little Bear Canyon, a monitoring program should be developed that, at a minimum, consists of the following:~~

- ~~Additional monitoring of spring sites LB-7, LB-7A, LB-7B, LB-7C, LB-5A, and LB-12;~~
- ~~A map identifying and showing the general location of vegetation in the area that could potentially be affected by mining in Little Bear Canyon; and~~
- ~~A detailed map of riparian and wetland vegetation associated with spring sites LB-7, LB-7A, LB-7B, LB-7C, LB-5A, and LB-12.~~

~~In the event of single seam mining beyond spring site LB-7 in Little Bear Canyon, the Permittee will need to include spring sites LB-7, LB-7A, LB-7B, and LB-7C into their quarterly monitoring plan. The springs will be monitored for flow and field parameters.~~

Surface Water Monitoring[sm:)38]

The surface water monitoring plan has been updated to include the monitoring of four creeks with six monitoring sites located within and adjacent to the South Crandall lease area as shown on Plate 7-18. The creeks to be monitored include: the perennial Little Bear Canyon Creek (intermittent upstream of Little Bear Spring), the ephemeral drainage in SW ¼ of Section 4, T16S R7E (Section 4 Creek), the ephemeral drainage located along the west permit boundary along the border of Sections 5 and 6, T16S R7E, and the intermittent creek in Section 5, T16S R7E that drains into Crandall Creek downstream of the Genwal surface facilities (Section 5 Creek). Both Little Bear Canyon Creek and Section 4 Creek will be monitored approximately 100 feet above their confluence with Huntington Creek, the drainage along the west permit boundary will be monitored at station IBC-1 above the confluence with Crandall Creek. Section 5 Creek will be monitored above the confluence with Crandall Creek and at two stations located at the confluence of the drainages upper left and right forks. All of the creek sites will be monitored for the field and laboratory water quality parameters listed in Table 7-8. Protocols for monitoring are listed in Table 7-10 of the MRP.

The surface water monitoring plan has been updated to include the monitoring of Shingle Creek within the 120-acre IBC modification to lease U-68082 as shown on Plate 7-18. Shingle Creek is an intermittent creek that branches into a right and left fork at the east boundary of the lease mod area. Because Shingle Creek is intermittent, and only a portion of the upper reaches of the right and left forks flows within the potential subsidence area, no additional surface water monitoring was recommended by the Division. However, the Forest Service owns water rights for Shingle Creek and believes that contributing springs in the canyon should be protected. The Division, in consultation with the Forest Service, has agreed that a water monitoring plan for

Shingle Canyon should be incorporated in the MRP for the Crandall Canyon Mine. The Permittee has committed, at the Division's request, to a water monitoring plan that includes quarterly monitoring for flow and field parameters of a stream site for Shingle Creek located just downstream of spring site SP-18 and the confluence of the left and right forks of Shingle Creek. The creek sites will be monitored for the field and laboratory water quality parameters listed in Table 7-8. Protocols for monitoring are listed in Table 7-10 of the MRP.

~~The existing surface water monitoring plan has been updated to include the monitoring of four creeks with six monitoring sites located within and adjacent to the South Crandall Lease and the additional 40-acre sublease areas as shown on Plate 7-18. The creeks to be monitored include: the intermittent Little Bear Canyon Creek, the ephemeral drainage in SW ¼ of Section 4, T16S R7E (Section 4 Creek), the ephemeral drainage located along the west permit boundary along the border of Sections 5 and 6, T16S R7E, and the intermittent creek in Section 5, T16S R7E that drains into Crandall Creek downstream of the Genwal surface facilities (Section 5 Creek). Both Little Bear Canyon Creek and Section 4 Creek will be monitored approximately 100 feet above their confluence with Huntington Creek. The drainage along the west permit boundary will be monitored at station IBC-1 above the confluence with Crandall Creek. Section 5 Creek will be monitored above the confluence with Crandall Creek and at two stations located at the confluence of the drainages upper left and right forks. All of the creek sites will be monitored for the field and laboratory water quality parameters listed in Table 7-8. Protocols for monitoring are listed in Table 7-10 of the MRP.~~

Transfer of Wells[sm:)39]

Transfer of wells is not currently considered. Any future transfers will be in accordance with DOGM approval.

Findings:

The information provided ~~does not adequately address~~meets the minimum requirements of the Operation Plan - Hydrologic Information section of the regulations. ~~Prior to approval the following information must be provided in accordance with:~~

~~**R645-301-727**, the Permittee should change the text to reflect that an uninterrupted supply of culinary water will be assured irrespective of whether mining can be conclusively shown to have affected Little Bear Spring. Specifically, text in Section 7.24.1, Mitigation and Control Plan, stating "Should it be necessary to develop alternate water supplies due to unexpected diminution or interruption of flows as a direct result of mining activities…" should also reference the additional protection placed on Little Bear Spring. Text in Section 7.27, Alternative Water Source Information, stating "Mitigation for potential disruption to Little Bear Spring will be accomplished … if mining activity in the South Crandall lease tract affect the quality or quantity of the spring" should be changed to be consistent with the language of Special Coal Lease Stipulation #17.{ TA \l "**R645-301-727**, the Permittee should change the text to reflect that an uninterrupted supply of culinary water will be assured irrespective of whether mining can be conclusively~~

~~shown to have affected Little Bear Spring. Specifically, text in Section 7.24.1, Mitigation and Control Plan, stating \"Should it be necessary to develop alternate water supplies due to unexpected diminution or interruption of flows as a direct result of mining activities…\" should also reference the additional protection placed on Little Bear Spring. Text in Section 7.27, Alternative Water Source Information, stating \"Mitigation for potential disruption to Little Bear Spring will be accomplished … if mining activity in the South Crandall lease tract affect the quality or quantity of the spring\" should be changed to be consistent with the language of Special Coal Lease Stipulation #17." \s "R645-301-727, the Permittee should change the text to reflect that an uninterrupted supply of culinary water will be assured irrespective of whether mining can be conclusively shown to have affected Little Bear Spring. Specifically, text in Section 7.24." \c 6 }~~

~~**R645-301-731-211**, the Permittee needs to develop and have in place a monitoring program at least two years prior to conducting multiple seam mining beyond spring site LB-7 in Little Bear Canyon. The monitoring program should be approved by the Division in concurrence with the Forest Service prior to implementation. At a minimum, the monitoring program should consist of the following: (1) Additional monitoring of spring sites LB-7, LB-7A, LB-7B, LB-7C, LB-5A, and LB-12; (2) A map identifying and showing the general location of vegetation in the area that could potentially be affected by mining in Little Bear Canyon; and (3) A detailed map of riparian and wetland vegetation associated with spring sites LB-7, LB-7A, LB-7B, LB-7C, LB-5A, and LB-12.{ TA \l "**R645-301-731-211**, the Permittee needs to develop and have in place a monitoring program at least two years prior to conducting multiple seam mining beyond spring site LB-7 in Little Bear Canyon. The monitoring program should be approved by the Division in concurrence with the Forest Service prior to implementation. At a minimum, the monitoring program should consist of the following: (1) Additional monitoring of spring sites LB-7, LB-7A, LB-7B, LB-7C, LB-5A, and LB-12; (2) A map identifying and showing the general location of vegetation in the area that could potentially be affected by mining in Little Bear Canyon; and (3) A detailed map of riparian and wetland vegetation associated with spring sites LB-7, LB-7A, LB-7B, LB-7C, LB-5A, and LB-12." \s "R645-301-731-211, the Permittee needs to develop and have in place a monitoring program at least two years prior to conducting multiple seam mining beyond spring site LB-7 in Little Bear Canyon. The monitoring program should be approved by the Division i" \c 6 }~~

~~**R645-301-731-211**, the Permittee will need to include spring sites LB-7, LB-7A, LB-7B, and LB-7C into their quarterly monitoring plan in the event that single seam mining is to be conducted beyond spring site LB-7 in Little Bear Canyon. The springs will be monitored for flow and field parameters.{ TA \l "**R645-301-731-211**, the Permittee will need to include spring sites LB-7, LB-7A, LB-7B, and LB-7C into their quarterly monitoring plan in the event that single seam mining is to be conducted beyond spring site LB-7 in Little Bear Canyon. The springs will~~

~~be monitored for flow and field parameters." \s "R645-301-731-211, the Permittee will need to include spring sites LB-7, LB-7A, LB-7B, and LB-7C into their quarterly monitoring plan in the event that single seam mining is to be conducted beyond spring site LB-7 in Little Bear Canyon. The springs will b" \c 6 }~~

RECLAMATION PLAN

GENERAL REQUIREMENTS[sm:)40]

Regulatory Reference: PL 95-87 Sec. 515 and 516; 30 CFR Sec. 784.13, 784.14, 784.15, 784.16, 784.17, 784.18, 784.19, 784.20, 784.21, 784.22, 784.23, 784.24, 784.25, 784.26; R645-301-231, -301-233, -301-322, -301-323, -301-331, -301-333, -301-341, -301-342, -301-411, -301-412, -301-422, -301-512, -301-513, -301-521, -301-522, -301-525, -301-526, -301-527, -301-528, -301-529, -301-531, -301-533, -301-534, -301-536, -301-537, -301-542, -301-623, -301-624, -301-625, -301-626, -301-631, -301-632, -301-731, -301-723, -301-724, -301-725, -301-726, -301-728, -301-729, -301-731, -301-732, -301-733, -301-746, -301-764, -301-830.

PROTECTION OF FISH, WILDLIFE, AND RELATED ENVIRONMENTAL VALUES[sm:)41]

Regulatory Reference: 30 CFR Sec. 817.97; R645-301-333, -301-342, -301-358.

Analysis:

For those areas disturbed by mining activities, high value habitats (pinyon-juniper, agricultural and riparian areas) will be restored; in many cases, they will be enhanced beyond their premining condition. The goals are to create a diversified cover and/or habitat that will support a wide range of species while restoring to a premining condition and, where feasible, enhancing habitat. On September 21, 1993, representatives from Genwal, the Division, and Wildlife Resources met on-site to discuss wildlife habitat enhancement for reclamation. Subsequently, Wildlife Resources wrote Genwal a letter with enhancement suggestions. This letter has been incorporated in the plan, and Genwal commits to use the recommendations. They include making several rock piles and placing modified utility poles with attached nesting boxes near the perimeter of the disturbed area. These measures were felt by Wildlife Resources to be the most practical means of enhancing wildlife habitat in this area. Combined with the revegetation plan, these methods can be considered the best technology currently available.

Findings:

The information provided adequately addresses the minimum requirements of the Reclamation Plan – Protection of Fish, Wildlife, and Related Environmental Values section of the regulations.

REVEGETATION

Regulatory Reference: 30 CFR Sec. 785.18, 817.111, 817.113, 817.114, 817.116; R645-301-244, -301-353, -301-354, -301-355, -301-356, -302-280, -302-281, -302-282, -302-283, -302-284.

Analysis:

Revegetation: General Requirements[sm:)42]

It should be noted that there is no surface disturbance associated with the South Crandall lease area, the additional 40-acre sublease area, or the 120-acre IBC modification to lease U-86082. However, for those areas disturbed by mining activities topsoil will be redistributed within 30 days of completion of grading in late September or early October. Soil amendments will be applied if necessary before the end of October. Seeding will commence as soon as the seedbed is finished in the late fall. Tree planting will be done in conjunction with seeding or in the following spring as soon as the soil is workable.

The Permittee commits to inoculating the soil with microorganisms prior to seeding. Some research indicates this is a necessary step for establishing certain species although there has been successful revegetation in some areas with essentially sterile soil and no attempt to inoculate. The Permittee and the Division should look at current findings at the time of reclamation to determine the best methods.

The application contains a seed/planting mix for riparian and one for non-riparian areas. The seed mix for non-riparian areas was developed primarily for the south-facing slope where existing disturbances are located. The north-facing slope has a very different vegetation community, but many of the species in the existing seed/planting mixture are appropriate for the north-facing slopes. Also, the application contains a plan to transplant woody plants of species more suited to the north-facing slopes.

The seed/planting mix for riparian areas includes a mixture of species suitable for both upland and riparian areas. Willows, dogwoods or roses would be planted at one-foot intervals along the stream. In response to comments from the Forest Service, the Permittee has committed to plant horsetail plugs about every two feet. Additional trees and shrubs would be planted farther away from the creek.

The seeding and planting mixes in the plan fulfill regulatory requirements for introduced species, diversity, seasonality, and the postmining land use. Three introduced species are included, and they are all highly desirable. They should not be overly competitive or displace native species in the area. Small burnet and yellow sweet clover are fairly short-lived species that will probably not be present after the ten-year extended responsibility period. The seed and planting mixes are expected to provide successful revegetation if proper reclamation methods are used.

The entire area of disturbance will be hydromulched with long fiber wood mulch. Tackifying agents will be added to the hydromulch, and the application shows tackifier application rates for varying slopes.

The Permittee and the Division investigated the use of various mulches, particularly for the steep north-facing hillside. There are many types of hydromulch available, and the Permittee

intends to use one with coarse, long fibers. This type of mulch is preferred over a mat because mats often have erosion under them.

It is anticipated that mulch technology will change over the next several years until the site is reclaimed. The Permittee will need to use the best technology currently available to control erosion and sedimentation, particularly in the area near the stream.

No irrigation is anticipated. The Permittee commits to avoid using persistent pesticides and to prevent personnel-caused fires. However, a contingency irrigation plan is recommended for transplants. Dry conditions could necessitate watering transplants for the first one or two summers.

Musk thistle is a very serious problem at mid- to high elevations in Utah. Although this noxious weed is not widespread in Huntington Canyon, it has been found at the Crandall Canyon Mine. Disturbed and newly seeded areas are very prone to noxious weed invasion. The Permittee should plan now for noxious weed control during reclamation as it will almost certainly be necessary.

On January 1, 1994, the Forest Service issued a closure order for any straw or hay that is not certified to be free of noxious weeds. This includes transportation across Forest Service lands. The applicant is not planning to use straw or hay mulch in reclamation, but any straw or hay bales that are used for sediment control will need to be certified.

Revegetation: Standards For Success[sm:)43]

A vegetation reference area has been established in the mountain shrub/grassland community above the mine portals for comparison with vegetation on reclaimed areas that had this community before mining. Another reference area has been established to compare to areas with spruce/fir/aspen communities. This reference area is south of the portal development area.

Woody plant density standards have been established for three areas of the mine. For areas to be compared with the mountain shrub/grassland reference area, the standard for woody species density has been set at 1336 shrubs per acre. This is based on reference area data. The standard for north-facing slopes has been set at 4000 per acre based on baseline information in the plan and consultation with Wildlife Resources. The riparian area has about 11,224 shrubs and trees per acre, and shrubs and trees will be planted in this area at the rate of about 3000 per acre. It is expected that these will multiply through the extended responsibility period, and the success standard has been set at 6000 per acre.

There are some differences between the disturbed and reference area spruce/fir/aspen communities, but they are primarily in species composition rather than the total amount of cover. The current reference area has 75.25% total living cover, and the disturbed area has 78.75%.

These values are not statistically different at the 90% confidence level. The proposed disturbed area has statistically more overstory than the reference area, but understory cover

values are statistically the same for both areas. Also, the woody species density is higher in the reference area.

Despite the differences between the proposed disturbed and reference areas, there are several similarities, including location, community type, soils, aspect, and total cover. The actual species present and the amount of cover from overstory vary, but these will vary even more significantly when comparing reclaimed and reference areas. Additionally, the woody plant density success standards are established in consultation with Wildlife Resources rather than being based strictly on baseline information in the plan. For these reasons, the reference area is considered an acceptable revegetation success standard for spruce/fir/aspen areas.

Portions of the north-facing slope have been affected by natural soil movement and have less vegetation than adjacent areas. The Division could accept a different revegetation success standard for these areas rather than comparing them to the spruce/fir/aspen reference area. However, the permittee has not included a separate standard in the MRP even though the report from the permittee's consultant discusses using another standard. A revegetation reference area was not proposed, and the number of samples taken in these areas is not sufficient to allow the baseline method to be used.

In order to meet the erosion control performance standards in the areas that have had soil movement, it will probably be necessary to establish nearly as much vegetation as in spruce/fir/aspen areas. The main question is whether establishing this much vegetation is feasible. The various revegetation and stabilization techniques that are planned should allow more vegetation to become established than currently exists. If, in the future, the permittee desires to propose a reference area revegetation success standard in a similar area, the Division could compare it to the area now proposed to be disturbed. If there is some possibility a different success standard may be proposed in the future, the areas with soil movement should be mapped now.

The approved MRP includes diversity standards for all disturbed areas. The standards currently in the plan are minimum and maximum relative cover values for grasses, shrubs, and broadleaf forbs in the three major disturbed vegetation types. In addition, the MRP states that no one species will make up more than 60% of the cover in its respective vegetation class except that individual species of shrubs and trees will make up no more than 80% of the density for this class. The approved MRP gives a monitoring schedule and methodologies for checking success of revegetation. In the disturbed spruce/fir/aspen areas, the standard will be 3-15% relative cover from broadleaf forbs, at least 15% cover from trees and shrubs, and the balance from grasses. This leaves a lot of latitude between grasses and woody plants since woody plants are expected to eventually dominate the area. Until then, grasses are expected to dominate the cover.

The riparian area should be dominated by woody species. The standard is 5-10% relative cover from broadleaf forbs, 40-85% relative cover from trees and shrubs, and 10-50% relative cover from grasses and grasslike plants.

For both riparian and spruce/fir/aspen areas, as in the other areas, no one species will make up more than 60% of the cover in its respective vegetation class except that individual species of trees and shrubs will make up no more than 80% of the density for this class.

The diversity standards for south-facing slopes are based on Natural Resource Conservation Service range site potential plant community data. For riparian areas and north-facing slopes, the standards are based on professional judgment by a soil scientist and botanist with the Forest Service and a Division biologist. The standards allow some flexibility but ensure a reasonably diverse plant community.

R645-301-353.140 requires that the vegetative cover be capable of stabilizing the soil surface from erosion. The permittee intends to use the Erosion Condition Classification System to compare reclaimed areas with adjacent undisturbed areas. This method was developed by the Office of Surface Mining, and, while it is a qualitative judgment, it provides a reasonably good estimate of how stable a site is. Even if vegetative cover is equal to that of the reference area, the reclaimed area may not be stable. R645-301-356.250 says that for areas previously disturbed by mining that were not reclaimed and that are remined or redisturbed, at a minimum, the vegetative ground cover will be not less than the ground cover existing before redisturbance and will be adequate to control erosion. The vegetative ground cover existing before redisturbance was 50.3%. Relatively little of this cover was from plants that would be considered weeds. This figure has been established as the vegetative cover standard for success for the areas previously disturbed by mining.

Findings:

The information provided adequately addresses the minimum requirements of the Reclamation Plan - Revegetation section of the regulations.

CUMULATIVE HYDROLOGIC IMPACT ASSESSMENT (CHIA)[sm:)44]

Regulatory Reference: 30 CFR Sec. 784.14; R645-301-730.

Analysis:

The Division ~~is~~ has updated~~ing~~ the East Mountain CHIA to incorporate the expansion of the Crandall Canyon Mine into the South Crandall Canyon Lease Tract and the U-68082 Lease Modification area (March 28, 2005).

Findings:

The submittal contains sufficient hydrogeologic information for the Division to update the East Mountain CHIA.

[sm:)1]

During the development of the Technical Analysis, one or more drafts may be required in order to resolve deficiencies in the application in proposed permit changes. The Draft Technical Analysis will use this section, Summary of Deficiencies, to elaborate on changes to the plan, which are prerequisites to approval.

If a section is found to be unacceptable, the provisions in the finding must be addressed and submitted to the Division prior to approval. Missing information or information, which does not specifically address the regulatory requirements, is most often the cause for determination that the information is incomplete or unacceptable.

An example of the information to be presented in this section when writing a Draft Technical Analysis is as follows:

The Technical analysis of the proposed permit changes cannot be completed at this time. Additional information is requested of the permittee to address deficiencies in the proposal. A summary of deficiencies is provided below. Additional comments and concerns may also be found within the analysis and findings made in this Draft Technical Analysis. Upon finalization of this review, any deficiencies will be evaluated for compliance with the regulatory requirements. Such deficiencies may be conditioned to the requirements of the permit issued by the division, result in denial of the proposed permit changes, or may result in other executive or enforcement action and deemed necessary by the Division at that time to achieve compliance with the Utah Coal Regulatory Program.

Accordingly, the permittee must address those deficiencies as found within this Draft Technical Analysis and provide the following, prior to approval, in accordance with the requirements of:

R645-301-223, *the permittee must revise the soil map units delineated on Map 12, Soils Survey Map. Areas covered by coal mine waste where coal mine waste is covered by topsoil cannot be classified within the map units presented on the drawing or as described in the text of the plan. The map and plan information must meet the requirements of the USDA/SCS National Cooperative Soil Survey as incorporated by reference in this section and as referenced by R645-302-314.14*

R645-301-232, *the permittee must quantify the amount topsoil material and show the location of topsoil materials to be stockpiled within the permit area. Adequate drawings and design information must be provided in the plan to demonstrate that these areas adequately protect the topsoil from erosion.52*

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[sm:)2]

Minimum Regulatory Reference:

The operator of the coal mine and all owners and controllers of the operation must be identified by name and address. The Division with the Applicant/Violator System must crosscheck the information provided and other sources such as DOGM inspection and enforcement records, State corporation commission or tax records. If the Division identifies any errors in the ownership or control information, the applicant must be contacted to resolve the matter immediately. If the Division discovers that none of the persons identified in the application has had any previous mining experience, the applicant will be contacted to verify this fact.

The Applicant/Violator System will be updated with new information received by the Division.

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[sm:)3]

Minimum Regulatory Reference:

The application must inform the Division of any of the following:

(1) State or Federal permits suspension or revocation
(2) Bond or other security forfeiture in the last five years;
(3) Any State or Federal violations received in the last three years by the applicant or any subsidiary, affiliate, or persons controlled by or under common control with the applicant. All outstanding violations (regardless of date) must also be disclosed.

The Division will review all available information and will not issue a permit if any operation owned or controlled by the applicant or linked to the applicant is in violation of SMCRA or the State Program or any State or Federal environmental law.

The Division will notify the applicant of the violation, suspension or forfeiture hindering their current application for permit and give the applicant an opportunity to rebut the findings. The Division will keep the Applicant Violator System updated.

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[sm:)4]

Minimum Regulatory Reference:

Documents giving legal right to enter the permit area must be detailed in the application by date, type of document, land description and rights claimed. Any pending litigation over these legal rights must be disclosed.

The written consent of the landowner for the extraction of the coal by surface mining methods must also be included when the surface and mineral owners are different. Also a copy of the conveyance that grants the legal authority to extract the coal by surface methods will be included.

The Division does not have the authority to adjudicate property rights disputes.

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[sm:)5]

Minimum Regulatory Reference:

The application will describe and identify the lands (on a map) subject to coal mining over the life of the operation, including the size, sequence, and timing of the mining anticipated and permit boundaries. Coal mining and reclamation operations may only occur on the lands identified on the maps submitted and that are subject to the performance bond.

A public notice advertisement will contain a map or description of the precise location and boundaries of the proposed permit area. So that local residents can identify the area, the map must have a north arrow and may include local landmarks.

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[sm:)6]

Minimum Regulatory Reference:

The application will describe and identify the lands (on a map) subject to coal mining over the life of the operation, including the size, sequence, and timing of the mining anticipated and permit boundaries. Coal mining and reclamation operations may only occur on the lands identified on the maps submitted and that are subject to the performance bond.

A public notice advertisement will contain a map or description of the precise location and boundaries of the proposed permit area. So that local residents can identify the area, the map must have a north arrow and may include local landmarks.

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[sm:)7]

Minimum Regulatory Reference:

After the application has been determined "administratively complete," an advertisement must be placed in a local newspaper of general circulation in the locality of the proposed surface coal mining and reclamation operation at least once a week for four consecutive weeks. A copy of the advertisement as it will appear in the newspaper will be submitted to the regulatory authority.

At a minimum, the following will be included in the ad:

(1) The name and business address of the applicant.
(2) A map or description
(3) The location where a copy of the application is available for public inspection.
(4) The name and address of the Division where written comments, objections, or requests for informal conferences on the application may be submitted.
(5) If an applicant seeks a permit to mine within 100 feet of the outside right-of-way of a public road or to relocate or close a public road, except where public notice and hearing have previously been provided for this particular part of the road; a concise statement describing the public road, the particular part to relocated or closed, and the approximate timing and duration of the relocation or closing.
(6) If the application includes a request for an experimental practice, a statement indicating that an experimental practice is requested and identifying the regulatory provisions for which a variance is requested.

The Division will notify in writing local governmental agencies and all Federal or State governmental agencies involved in or with an interest in the permit process.

Documentation of the public notice and comment period required for the Permit should be incorporated as part of the Permit.

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[sm:)8]

Minimum Regulatory Requirements:

Describe and identify the lands subject to surface coal mining operations over the estimated life of those operations and the size, sequence, and timing of the subareas for which it is anticipated that individual permits for mining will be sought.

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[sm:)9]

Minimum Regulatory Requirements:

Describe and identify the nature of cultural historic and archeological resources listed or eligible for listing on the National Register of Historic Places and known archeological sites within the proposed permit and adjacent areas. The description shall be based on all available information, including, but not limited to, information from the State Historic Preservation Officer and local archeological, historical, and cultural preservation groups.

Identify and evaluate important historic and archeological resources that may be eligible for listing on the National Register of Historic Places, through the collection of additional information, conduct of field investigations, or other appropriate analyses.

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[sm:)10]

Minimum Regulatory Requirements:

Provide a map that delineates existing vegetative types and a description of the plant communities within the area affected by surface operations and facilities and within any proposed reference area. The description shall include information adequate to predict the potential for reestablishing vegetation. The map or aerial photograph is required, sufficient adjacent areas shall be included to allow evaluation of vegetation as important habitat for fish and wildlife for those species of fish and wildlife as identified under the fish and wildlife resource information.

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[sm:)11]

Minimum Regulatory Requirements:

The application shall include fish and wildlife resource information for the permit area and adjacent area. The scope and level of detail for such information shall be determined by the Division in consultation with State and Federal agencies with responsibilities for fish and wildlife and shall be sufficient to design the protection and enhancement plan required under the operation and reclamation plan.

Site-specific resource information necessary to address the respective species or habitats shall be required when the permit area or adjacent area is likely to include:

(1) Listed or proposed endangered or threatened species of plants or animals or their critical habitats listed by the Secretary under the endangered Species Act of 1973, as amended (16 U.S.C. 1531 et seq.), or those species or habitats protected by similar State statutes;

(2) Habitats of unusually high value for fish and wildlife such as important streams, wetlands, riparian areas, cliffs supporting raptors, areas offering special shelter or protection, migration routes, or reproduction and wintering areas; or

(3) Other species or habitats identified through agency consultation as requiring special protection under State or Federal law.

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[sm:)12]

Minimum Regulatory Requirements:

Each application shall include geologic information in sufficient detail to assist in: determining the probable hydrologic consequences of the operation upon the quality and quantity of surface and ground water in the permit and adjacent areas, including the extent to which surface- and ground-water monitoring is necessary; determining all potentially acid- or toxic-forming strata down to and including the stratum immediately

below the coal seam to be mined; determining whether reclamation can be accomplished and whether the proposed operation has been designed to prevent material damage to the hydrologic balance outside the permit area; and, preparing the subsidence control plan.

Geologic information shall include, at a minimum, a description of the geology of the proposed permit and adjacent areas down to and including the deeper of either the stratum immediately below the lowest coal seam to be mined or any aquifer below the lowest coal seam to be mined which may be adversely impacted by mining. This description shall include the areal and structural geology of the permit and adjacent areas, and other parameters which influence the required reclamation and it shall also show how the areal and structural geology may affect the occurrence, availability, movement, quantity, and quality of potentially impacted surface and ground water. It shall be based on maps and plans required as resource information for the plan, detailed site specific information as required below, and, geologic literature and practices.

For any portion of a permit area in which the strata down to the coal seam to be mined will be removed or are already exposed, samples shall be collected and analyzed from test borings; drill cores; or fresh, unweathered, uncontaminated samples from rock outcrops down to and including the deeper of either the stratum immediately below the lowest coal seam to be mined or any aquifer below the lowest coal seam to be mined which may be adversely impacted by mining. The analyses shall result in the following:

(1) Logs showing the lithologic characteristics including physical properties and thickness of each stratum and location of ground water where occurring;
(2) Chemical analyses identifying those strata that may contain acid- or toxic-forming, or alkalinity-producing materials and to determine their content, except that the Division may find that the analysis for alkalinity-producing material is unnecessary; and
(3) Chemical analysis of the coal seam for acid- or toxic-forming materials, including the total sulfur and pyritic sulfur, except that the Division may find that the analysis of pyritic sulfur content is unnecessary.

For lands within the permit and adjacent areas where the strata above the coal seam to be mined will not be removed, samples shall be collected and analyzed from test borings or drill cores to provide the following data:

(1) Logs of drill holes showing the lithologic characteristics, including physical properties and thickness of each stratum that may be impacted, and location of ground water where occurring;
(2) Chemical analyses for acid- or toxic-forming or alkalinity-producing materials and their content in the strata immediately above and below the coal seam to be mined;
(3) Chemical analyses of the coal seam for acid- or toxic-forming materials, including the total sulfur and pyritic sulfur, except that the Division may find that the analysis of pyrite sulfur content is unnecessary; and

(4) For standard room-and-pillar mining operations, the thickness and engineering properties of clays or soft rock such as clay shale, if any, in the stratum immediately above and below each coal seam to be mined.

If determined to be necessary to protect the hydrologic balance, to minimize or prevent subsidence, or to meet the performance standards, the Division may require the collection, analysis, and description of additional geologic information.

An applicant may request the Division to waive in whole or in part the requirements of the borehole information or analysis required of this section. The waiver may be granted only if the Division finds in writing that the collection and analysis of such data are unnecessary because other information having equal value or effect is available to the Division in a satisfactory form.

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[sm:)13]

All water-quality analyses performed to meet the requirements of this section shall be conducted according to the methodology in the 15th edition of "Standard Methods for the Examination of Water and Wastewater," which is incorporated by reference, or the methodology in 40 CFR Parts 136 and 434. Water-quality sampling shall be conducted according to either methodology listed above when feasible. This incorporation by reference was approved by the Director of the Federal Register on October 26, 1983. This document is incorporated as it exists on the date of the approval, and a notice of any change in it will be published in the Federal Register.

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[sm:)14]

The application shall include the following baseline hydrologic information, and any additional information required by the Division.

(1) Ground-water information. The location and ownership for the permit and adjacent areas of existing wells, springs, and other ground-water resources, seasonal quality and quantity of ground water, and usage. Water-quality descriptions shall include, at a minimum, total dissolved solids or specific conductance corrected to 25?C, pH, total iron, and total manganese. Ground-water quantity descriptions shall include, at a minimum, approximate rates of discharge or usage and depth to the water in the coal seam, and each water-bearing stratum above and potentially impacted stratum below the coal seam.

(2) Surface-water information. The name, location, ownership, and description of all surface-water bodies such as streams, lakes, and impoundments, the location of any discharge into any surface-water body in the proposed permit and adjacent areas, and information on surface-water quality and quantity sufficient to demonstrate seasonal variation and water usage. Water-quality descriptions shall include, at a minimum, baseline information on total suspended solids, total dissolved solids or

specific conductance corrected to 25?C, pH, total iron, and total manganese. Baseline acidity and alkalinity information shall be provided if there is a potential for acid drainage from the proposed mining operation. Water-quantity descriptions shall include, at a minimum, baseline information on seasonal flow rates.

(3) Supplemental information. If the determination of the probable hydrologic consequences (PHC) indicates that adverse impacts on or off the proposed permit area may occur to the hydrologic balance, or that acid-forming or toxic-forming material is present that may result in the contamination of ground-water or surface-water supplies, then supplemental information shall be provided to evaluate such probable hydrologic consequences and to plan remedial and reclamation activities. Such supplemental information may be based upon drilling, aquifer tests, hydrogeologic analysis of the water-bearing strata, flood flows, or analysis of other water-quality or quantity characteristics.

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[sm:)15]

The use of modeling techniques, interpolation, or statistical techniques may be included as part of the permit application, but actual surface- and ground-water information may be required for each site even when such techniques are used.

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[sm:)16]

(1) The application shall contain a determination of the probable hydrologic consequences (PHC) of the proposed operation based upon the quality and quantity of surface and ground water under seasonal flow conditions for the proposed permit and adjacent areas.

(2) The PHC determination shall be based on baseline hydrologic, geologic, and other information collected for the permit application and may include data statistically representative of the site.

(3) The PHC determination shall include findings on: whether adverse impacts may occur to the hydrologic balance; whether acid-forming or toxic-forming materials are present that could result in the contamination of surface or ground water supplies; and, what impact the proposed operation will have on sediment yield from the disturbed area; acidity, total suspended and dissolved solids, and other important water quality parameters of local impact; flooding or streamflow alteration; ground water and surface water availability; and other characteristics as required.

(4) An application for a permit revision shall be reviewed by the Division to determine whether a new or updated PHC shall be required.

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[sm:)17]

(1) The application shall include a ground-water monitoring plan based upon the PHC determination and the analysis of all baseline hydrologic,

geologic, and other information in the permit application. The plan shall provide for the monitoring of parameters that relate to the suitability of the ground water for current and approved postmining land uses and to the objectives for protection of the hydrologic balance. It shall identify the quantity and quality parameters to be monitored, sampling frequency, and site locations. It shall describe how the data may be used to determine the impacts of the operation upon the hydrologic balance. At a minimum, total dissolved solids or specific conductance corrected to 25?C, pH, total iron, total manganese, and water levels shall be monitored and data submitted to the Division at least every 3 months for each monitoring location. The Division may require additional monitoring.

(2) *If an applicant can demonstrate by the use of the PHC determination and other available information that a particular water-bearing stratum in the proposed permit and adjacent areas is not one which serves as an aquifer which significantly ensures the hydrologic balance within the cumulative impact area, then monitoring of that stratum may be waived by the Division.*

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[sm:)18]

(1) The application shall include a surface-water monitoring plan based upon the PHC determination and the analysis of all baseline hydrologic, geologic, and other information in the permit application. The plan shall provide for the monitoring of parameters that relate to the suitability of the surface water for current and approved postmining land uses and to the objectives for protection of the hydrologic balance, as well as the effluent limitations found at 40 CFR Part 434.

(2) The plan shall identify the surface-water quantity and quality parameters to be monitored, sampling frequency, and site locations. It shall describe how the data may be used to determine the impacts of the operation upon the hydrologic balance. At all monitoring locations in streams, lakes, and impoundments that are potentially impacted or into which water will be discharged and at upstream monitoring locations, the total dissolved solids or specific conductance corrected to 25?C, total suspended solids, pH, total iron, total manganese, and flow shall be monitored. For point-source discharges, monitoring shall be conducted in accordance with 40 CFR Parts 122, 123, and 434 and as required by the National Pollutant Discharge Elimination System permitting authority.

(3) The monitoring reports shall be submitted to the Division every 3 months. The Division may require additional monitoring.

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[sm:)19]

(1) *Hydrologic and geologic information for the cumulative impact area necessary to assess the probable cumulative hydrologic impacts of the proposed operation and all anticipated mining on surface- and ground-water systems shall be provided if available from appropriate Federal or State agencies.*

(2) *If this information is not available from such agencies, then the applicant may gather and submit this information as part of the permit application.*

(3) *The permit shall not be approved until the necessary hydrologic and geologic information is available.*

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[sm:)20]

Minimum Regulatory Requirements:

The permit application must include as part of the Resource Information, the following maps, plans and cross sections:

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[sm:)21]

The boundaries of all areas proposed to be affected over the estimated total life of the underground mining activities, with a description of size, sequence, and timing of the mining of subareas for which it is anticipated that additional permits will be sought.

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[sm:)22]

Known archeological sites within the permit or adjacent areas. Note - Information on the nature and location of archeological resources on public land and Indian land as required under the Archeological Resources Protection Act of 1979 must be submitted separately from the application, and marked and held as confidential.

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[sm:)23]

The boundaries of any public park and locations of any cultural and historical resources listed or eligible for listing in the National Register of Historic Places. Each cemetery that is located in or within 100 feet of the proposed permit area. Any land within the proposed permit area which is within the boundaries of any units of the National System of Trails or the Wild and Scenic Rivers System, including study rivers designated under Section 5(a) of the Wild and Scenic Rivers Act. Any other relevant information required by the Division.

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[sm:)24]

Sufficient slope measurements to adequately represent the existing land surface configuration of the area affected by surface operations and facilities, measured and recorded according to the following: each measurement shall consist of an angle of inclination along the prevailing slope extending 100 linear feet above and below or

beyond the coal outcrop or the area to be disturbed or, where this is impractical, at locations specified by the Division; where the area has been previously mined, the measurements shall extend at least 100 feet beyond the limits of mining disturbances, or any other distance determined by the Division to be representative of the premining configuration of the land; and, slope measurements shall take into account natural variations in slope, to provide accurate representation of the range of natural slopes and reflect geomorphic differences of the area to be disturbed.

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[sm:)25]

The boundaries of land within the proposed permit area upon which the applicant has the legal right to enter and begin underground mining activities.

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[sm:)26]

Location and extent of subsurface water, if encountered, within the proposed permit or adjacent areas, including, but not limited to, areal and vertical distribution of aquifers, and portrayal of seasonal differences of head in different aquifers on cross sections and contour maps.

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[sm:)27]

The locations of water-supply intakes for current users of surface waters flowing into, out of, and within a hydrologic area defined by the Division, and those surface waters which will receive discharges from affected areas in the proposed permit area. Location of surface water bodies such as streams, lakes, ponds, springs, constructed or natural drains, and irrigation ditches within the proposed permit and adjacent areas.

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[sm:)28]

The location and boundaries of any proposed reference areas for determining the success of revegetation.

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[sm:)29]

Minimum Regulatory Requirements:

Underground mining activities shall be conducted so as to maximize the utilization and conservation of the coal, while utilizing the best technology currently available to maintain environmental integrity, so that re-affecting the land in the future through surface coal mining operations is minimized.

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[sm:)30]

Include a survey, which shall show whether structures or renewable resource lands exist within the proposed permit area and adjacent area and whether subsidence, if

it occurred, could cause material damage or diminution of reasonably foreseeable use of such structures or renewable resource lands. If the survey shows that no such structures or renewable resource lands exist, or no such material damage or diminution could be caused in the event of mine subsidence, and if the Division agrees with such conclusion, no further information need be provided in the application under this section.

[sm:)31]

The operator shall either adopt measures consistent with known technology which prevent subsidence from causing material damage to the extent technologically and economically feasible, maximize mine stability, and maintain the value and reasonably foreseeable use of surface lands; or, adopt mining technology which provides for planned subsidence in a predictable and controlled manner. Nothing in this part shall be construed to prohibit the standard method of room-and-pillar mining.

The operator shall comply with all provisions of the approved subsidence control plan.

The operator shall correct any material damage resulting from subsidence caused to surface lands, to the extent technologically and economically feasible, by restoring the land to a condition capable of maintaining the value and reasonably foreseeable uses which it was capable of supporting before subsidence, and, to the extent required under applicable provisions of State law, either correct material damage resulting from subsidence caused to any structures or facilities by repairing the damage or compensate the owner of such structures or facilities in the full amount of the diminution in value resulting from the subsidence. Repair of damage includes rehabilitation, restoration, or replacement of damaged structures or facilities. Compensation may be accomplished by the purchase prior to mining of a non-cancelable premium-prepaid insurance policy.

Underground mining activities shall not be conducted beneath or adjacent to: public buildings and facilities; churches, schools, and hospitals; or, impoundments with a storage capacity of 20 acre-feet or more or bodies of water with a volume of 20 acre-feet or more, unless the subsidence control plan demonstrates that subsidence will not cause material damage to, or reduce the reasonably foreseeable use of, such features or facilities. If the Division determines that it is necessary in order to minimize the potential for material damage to the features or facilities described above or to any aquifer or body of water that serves as a significant water source for any public water supply system, it may limit the percentage of coal extracted under or adjacent thereto.

If subsidence causes material damage to any of the features or facilities, the Division may suspend mining under or adjacent to such features or facilities until the subsidence control plan is modified to ensure prevention of further material damage to such features or facilities.

The Division shall suspend underground mining activities under urbanized areas, cities, towns, and communities, and adjacent to industrial or commercial buildings,

major impoundments, or perennial streams, if imminent danger is found to inhabitants of the urbanized areas, cities, towns, or communities.

Within a schedule approved by the Division, the operator shall submit a detailed plan of the underground workings. The detailed plan shall include maps and descriptions, as appropriate, of significant features of the underground mine, including the size, configuration, and approximate location of pillars and entries, extraction ratios, measures taken to prevent or minimize subsidence and related damage, areas of full extraction, and other information required by the Division. Upon request of the operator, information submitted with the detailed plan may be held as confidential.

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[sm:)32]

At least 6 months prior to mining, or within that period if approved by the Division, the underground mine operator shall mail a notification to all owners and occupants of surface property and structures above the underground workings. The notification shall include, at a minimum, identification of specific areas in which mining will take place, dates that specific areas will be undermined, and the location or locations where the operator's subsidence control plan may be examined.

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[sm:)33]

Each application shall include a description of how, to the extent possible using the best technology currently available, the operator will minimize disturbances and adverse impacts on fish and wildlife and related environmental values, including compliance with the Endangered Species Act, during the surface coal mining and reclamation operations and how enhancement of these resources will be achieved where practicable. This description shall apply, at a minimum, to species and habitats identified. The description shall include: protective measures that will be used during the active mining phase of operation. Such measures may include the establishment of buffer zones, the selective location and special design of haul roads and powerlines, and the monitoring of surface water quality and quantity; and, enhancement measures that will be used during the reclamation and postmining phase of operation to develop aquatic and terrestrial habitat. Such measures may include restoration of streams and other wetlands, retention of ponds and impoundments, establishment of vegetation for wildlife food and cover, and the placement of perches and nest boxes. Here the plan does not include enhancement measures, a statement shall be given explaining why enhancement is not practicable.

Each operator shall, to the extent possible using the best technology currently available: ensure that electric powerlines and other transmission facilities used for, or incidental to, underground mining activities on the permit area are designed and constructed to minimize electrocution hazards to raptors, except where the Division determines that such requirements are unnecessary; locate and operate haul and access roads so as to avoid or minimize impacts on important fish and wildlife species or other species protected by State or Federal law; design fences, overland conveyors, and other

potential barriers to permit passage for large mammals except where the Division determines that such requirements are unnecessary; and, fence, cover, or use other appropriate methods to exclude wildlife from ponds which contain hazardous concentrations of toxic-forming materials.

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[sm:)34]

No underground mining activity shall be conducted which is likely to jeopardize the continued existence of endangered or threatened species listed by the Secretary or which is likely to result in the destruction or adverse modification of designated critical habitats of such species in violation of the Endangered Species Act of 1973, as amended (16 U.S.C. 1531 et seq.). The operator shall promptly report to the Division any State- or federally-listed endangered or threatened species within the permit area of which the operator becomes aware. Upon notification, the Division shall consult with appropriate State and Federal fish and wildlife agencies and, after consultation, shall identify whether, and under what conditions, the operator may proceed.

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[sm:)35]

No underground mining activity shall be conducted in a manner which would result in the unlawful taking of a bald or golden eagle, its nest, or any of its eggs. The operator shall promptly report to the Division any golden or bald eagle nest within the permit area of which the operator becomes aware. Upon notification, the Division shall consult with the U.S. Fish and Wildlife Service and also, where appropriate, the State fish and wildlife agency and, after consultation, shall identify whether, and under what conditions, the operator may proceed.

Nothing in these regulatory requirements shall authorize the taking of an endangered or threatened species or a bald or golden eagle, its nest, or any of its eggs in violation of the Endangered Species Act of 1973, as amended, 16 U.S.C. 1531 et seq., or the Bald Eagle Protection Act, as amended, 16 U.S.C. 668 et seq.

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[sm:)36]

Minimum Regulatory Requirements:

Each application will contain a plan for protection of vegetation, fish, and wildlife resources throughout the life of the mine. The plan will provide a description of the measures taken to disturb the smallest practicable area at any one time and through prompt establishment and maintenance of vegetation for interim stabilization of disturbed areas to minimize surface erosion. This may include part or all of the plan for final revegetation as described in reclamation plan for revegetation.

For UNDERGROUND COAL MINING AND RECLAMATION ACTIVITIES a description of the anticipated impacts of subsidence on renewable resource lands and how such impact will be mitigated needs to be presented.

A description of how, to the extent possible, using the best technology currently available, the operator will minimize disturbances and adverse impacts. This description will include protective measures that will be used during the active mining phase of operation. Such measures may include the establishment of buffer zones, the selective location and special design of haul roads and powerlines, the monitoring of surface water quality and quantity, and through prompt establishment and maintenance of vegetation for interim stabilization of disturbed areas to minimize surface erosion.

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[sm:)37]

In order to protect the hydrologic balance underground mining activities shall be conducted according to the hydrologic reclamation plan. Ground-water quality shall be protected by handling earth materials and runoff in a manner that minimizes acidic, toxic, or other harmful infiltration to ground-water systems and by managing excavations and other disturbances to prevent or control the discharge of pollutants into the ground water.

Ground-water monitoring shall be conducted according to the ground-water monitoring plan. The Division may require additional monitoring when necessary. Ground-water monitoring data shall be submitted every 3 months to the Division or more frequently as prescribed by the Division. Monitoring reports shall include analytical results from each sample taken during the reporting period. When the analysis of any ground-water sample indicates noncompliance with the permit conditions, the operator shall promptly notify the Division and immediately provide for any accelerated or additional monitoring necessary to determine the nature and extent of noncompliance and the results of the noncompliance. Plans and hydrologic information to evaluate and mitigate the noncompliance situation and information relevant to the PHC shall be submitted to the Division as required.

Ground-water monitoring shall proceed through mining and continue during reclamation until bond release. The Division may modify the monitoring requirements including the parameters covered and the sampling frequency if the operator demonstrates, using the monitoring data obtained, that: the operation has minimized disturbance to the prevailing hydrologic balance in the permit and adjacent areas and prevented material damage to the hydrologic balance outside the permit area; water quantity and quality are suitable to support approved postmining land uses; or, monitoring is no longer necessary to achieve the purposes set forth in the monitoring plan.

Equipment, structures, and other devices used in conjunction with monitoring the quality and quantity of ground water onsite and offsite shall be properly installed, maintained, and operated and shall be removed by the operator when no longer needed.

[sm:)38]

In order to protect the hydrologic balance, underground mining activities shall be conducted according to the approved plan, and the following: surface-water quality shall be protected by handling earth materials, ground-water discharges, and runoff in a manner that minimizes the formation of acidic or toxic drainage; prevents, to the extent possible using the best technology currently available, additional contribution of suspended solids to streamflow outside the permit area; and otherwise prevent water pollution. If drainage control, restabilization and revegetation of disturbed areas, diversion of runoff, mulching, or other reclamation and remedial practices are not adequate to meet water-quality standards and effluent limitations, the operator shall use and maintain the necessary water-treatment facilities or water-quality controls. Surface-water quantity and flow rates shall be protected by handling earth materials and runoff in accordance with the steps outlined in the approved plan.

Surface-water monitoring shall be conducted according to the approved surface-water monitoring plan. The Division may require additional monitoring when necessary. Surface-water monitoring data shall be submitted every 3 months to the Division or more frequently as prescribed by the Division. Monitoring reports shall include analytical results from each sample taken during the reporting period. When the analysis of any surface-water sample indicates noncompliance with the permit conditions, the operator shall promptly notify the Division and immediately provide for any accelerated or additional monitoring necessary to determine the nature and extent of noncompliance and the results of the noncompliance. Plans and hydrologic information to evaluate and mitigate the noncompliance situation and information relevant to the PHC shall be submitted to the Division as required. The reporting requirements of the water monitoring plan do not exempt the operator from meeting any National Pollutant Discharge Elimination System (NPDES) reporting requirements.

Surface-water monitoring shall proceed through mining and continue during reclamation until bond release. The Division may modify the monitoring requirements, except those required by the NPDES permitting authority, including the parameters covered and sampling frequency if the operator demonstrates, using the monitoring data obtained, that: the operation has minimized disturbance to the hydrologic balance in the permit and adjacent areas and prevented material damage to the hydrologic balance outside the permit area; water quantity and quality are suitable to support approved postmining land uses; and, monitoring is no longer necessary to achieve the purposes set forth in the approved monitoring plan.

Equipment, structures, and other devices used in conjunction with monitoring the quality and quantity of surface water onsite and offsite shall be properly installed, maintained, and operated and shall be removed by the operator when no longer needed.

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[sm:)39]

Before final release of bond, exploratory or monitoring wells shall be sealed in a safe and environmentally sound manner. With the prior approval of the Division, wells may be transferred to another party for further use. However, at a minimum, the conditions of such transfer shall comply with State and local laws and the permittee shall remain responsible for the proper management of the well until bond release.

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Minimum Regulatory Requirements:

Provide a plan for the reclamation of the lands within the proposed permit area, showing how the applicant will comply with the regulatory program and the environmental protection performance standards. The plan shall include, at a minimum, contain the following information for the proposed permit area: a detailed timetable for the completion of each major step in the reclamation plan; a detailed estimate of the cost of the reclamation of the proposed operations required to be covered by a performance bond, with supporting calculations for the estimates; a plan for backfilling, soil stabilization, compacting, and grading, with contour maps or cross sections that show the anticipated final surface configuration of the proposed permit area; a plan for redistribution of topsoil, subsoil, and other material along with a demonstration of the suitability of topsoil substitutes or supplements shall be based upon analysis of the thickness of soil horizons, total depth, texture, percent coarse fragments, pH, and areal extent of the different kinds of soils; other chemical and physical analyses, field-site trials, or greenhouse tests if determined to be necessary or desirable to demonstrate the suitability of the topsoil substitutes or supplements may also be required; a plan for revegetation including, but not limited to, descriptions of the schedule of revegetation, species and amounts per acre of seeds and seedlings to be used, methods to be used in planting and seeding, mulching techniques, irrigation, if appropriate, and pest and disease control measures, if any, measures proposed to be used to determine the success of revegetation, and, a soil testing plan for evaluation of the results of topsoil handling and reclamation procedures related to revegetation; a description of the measures to be used to maximize the use and conservation of the coal resource; a description of measures to be employed to ensure that all debris, acid-forming and toxic-forming materials, and materials constituting a fire hazard are disposed of accordingly and a description of the contingency plans which have been developed to preclude sustained combustion of such materials; a description, including appropriate cross sections and maps, of the measures to be used to seal or manage mine openings, and to plug, case, or manage exploration holes, other bore holes, wells, and other openings within the proposed permit area; and, a description of steps to be taken to comply with the requirements of the Clean Air Act, the Clean Water Act, and other applicable air and water quality laws and regulations and health and safety standards.

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Minimum Regulatory Requirements:

Where wetlands and habitats of unusually high value for fish and wildlife occur, the operator conducting underground mining activities shall provide a description of the measures taken to avoid disturbances to, enhance where practicable, restore, or replace, wetlands and riparian vegetation along rivers and streams and bordering ponds and lakes. Designs and plans for underground mining activities shall include measures to avoid disturbances to, enhance where practicable, or restore habitats of unusually high value for fish and wildlife.

Where fish and wildlife habitat is to be a postmining land use, the plant species to be used on reclaimed areas shall be selected on the basis of the following criteria:

(1) Their proven nutritional value for fish or wildlife.
~~(2)~~(1) Their use as cover for fish or wildlife.
~~(3)~~(1) Their ability to support and enhance fish or wildlife habitat after the release of performance bonds. The selected plants shall be grouped and distributed in a manner which optimizes edge effect, cover, and other benefits to fish and wildlife.

Where cropland is to be the postmining land use, and where appropriate for wildlife- and crop-management practices, the operator shall intersperse the fields with trees, hedges, or fence rows throughout the harvested area to break up large blocks of monoculture and to diversify habitat types for birds and other animals.

Where residential, public service, or industrial uses are to be the postmining land use and where consistent with the approved postmining land use, the operator shall intersperse reclaimed lands with greenbelts utilizing species of grass, shrubs, and trees useful as food and cover for wildlife.

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The permittee shall establish on regraded areas and on all other disturbed areas except water areas and surface areas of roads that are approved as part of the postmining land use, a vegetative cover that is in accordance with the approved permit and reclamation plan and that is: diverse, effective, and permanent; comprised of species native to the area, or of introduced species where desirable and necessary to achieve the approved postmining land use and approved by the Division; at least equal in extent of cover to the natural vegetation of the area; and, capable of stabilizing the soil surface from erosion.

The reestablished plant species shall: be compatible with the approved postmining land use; have the same seasonal characteristics of growth as the original vegetation; be capable of self-regeneration and plant succession; be compatible with the plant and animal species of the area; and, meet the requirements of applicable State and Federal seed, poisonous and noxious plant, and introduced species laws or regulations.

The Division may grant exception to these requirements when the species are necessary to achieve a quick-growing, temporary, stabilizing cover, and measures to establish permanent vegetation are included in the approved permit and reclamation plan.

When the Division approves a cropland postmining land use, the Division may grant exceptions to the requirements related to the original and native species of the area. Areas identified as prime farmlands must also meet those specific requirements as specified under that section.

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Success of revegetation shall be judged on the effectiveness of the vegetation for the approved postmining land use, the extent of cover compared to the cover occurring in natural vegetation of the area, and the general requirements for Revegetation. Standards for success and statistically valid sampling techniques for measuring success shall be selected by the Division and included in an approved regulatory program.

Standards for success shall include criteria representative of unmined lands in the area being reclaimed to evaluate the appropriate vegetation parameters of ground cover, production, or stocking. Ground cover, production, or stocking shall be considered equal to the approved success standard when it is not less than 90 percent of the success standard. The sampling techniques for measuring success shall use a 90-percent statistical confidence interval (i.e., a one-sided test with a 0.10 alpha error).

Standards for success shall be applied in accordance with the approved postmining land use and, at a minimum, the following conditions:

(1) For areas developed for use as grazing land or pasture land, the ground cover and production of living plants on the revegetated area shall be at least equal to that of a reference area or such other success standards approved by the Division.

~~*(2)*~~*(1) For areas developed for use as cropland, crop production on the revegetated area shall be at least equal to that of a reference area or such other success standards approved by the Division.*

~~*(3)*~~*(1) For areas to be developed for fish and wildlife habitat, recreation, shelter belts, or forest products, success of vegetation shall be determined on the basis of tree and shrub stocking and vegetative ground cover. Such parameters are described as follows: minimum stocking and planting arrangements shall be specified by the Division on the basis of local and regional conditions and after consultation with and approval by the State agencies responsible for the administration of forestry and wildlife programs. Consultation and approval may occur on either a programwide or a permit-specific basis; trees and shrubs that will be used in determining the success of stocking and the adequacy of the plant*

arrangement shall have utility for the approved postmining land use. Trees and shrubs counted in determining such success shall be healthy and have been in place for not less than two growing seasons. At the time of bond release, at least 80 percent of the trees and shrubs used to determine such success shall have been in place for 60 percent of the applicable minimum period of responsibility; and, vegetative ground cover shall not be less than that required to achieve the approved postmining land use.

For areas to be developed for industrial, commercial, or residential use less than 2 years after regrading is completed, the vegetative ground cover shall not be less than that required to control erosion.

For areas previously disturbed by mining that were not reclaimed to the requirements of the performance standards and that are remined or otherwise redisturbed by surface coal mining operations, as a minimum, the vegetative ground cover shall be not less than the ground cover existing before redisturbance and shall be adequate to control erosion.

The period of extended responsibility for successful revegetation shall begin after the last year of augmented seeding, fertilizing, irrigation, or other work, excluding husbandry practices that are approved by the Division.

In areas of more than 26.0 inches of annual average precipitation, the period of responsibility shall continue for a period of not less than five full years. Vegetation parameters identified for grazing land or pasture land and cropland shall equal or exceed the approved success standard during the growing seasons of any two years of the responsibility period, except the first year. Areas approved for the other uses shall equal or exceed the applicable success standard during the growing season of the last year of the responsibility period.

In areas of 26.0 inches or less average annual precipitation, the period of responsibility shall continue for a period of not less than 10 full years. Vegetation parameters shall equal or exceed the approved success standard for at least the last 2 consecutive years of the responsibility period.

The Division may approve selective husbandry practices, excluding augmented seeding, fertilization, or irrigation, provided it obtains prior approval from the Director as a State Program Amendment that the practices are normal husbandry practices, without extending the period of responsibility for revegetation success and bond liability, if such practices can be expected to continue as part of the postmining land use or if discontinuance of the practices after the liability period expires will not reduce the probability of permanent revegetation success. Approved practices shall be normal husbandry practices within the region for unmined lands having land uses similar to the approved postmining land use of the disturbed area, including such practices as disease,

pest, and vermin control; and any pruning, reseeding, and transplanting specifically necessitated by such actions.

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Minimum Regulatory Requirements:

The Division must provide an assessment of the probable cumulative hydrologic impacts (CHIA) of the proposed operation and all anticipated mining upon surface- and ground-water systems in the cumulative impact area. The CHIA shall be sufficient to determine, for purposes of permit approval, whether the proposed operation has been designed to prevent material damage to the hydrologic balance outside the permit area. The Division may allow the applicant to submit data and analyses relevant to the CHIA with the permit application. An application for a permit revision shall be reviewed by the Division to determine whether a new or updated CHIA shall be required.